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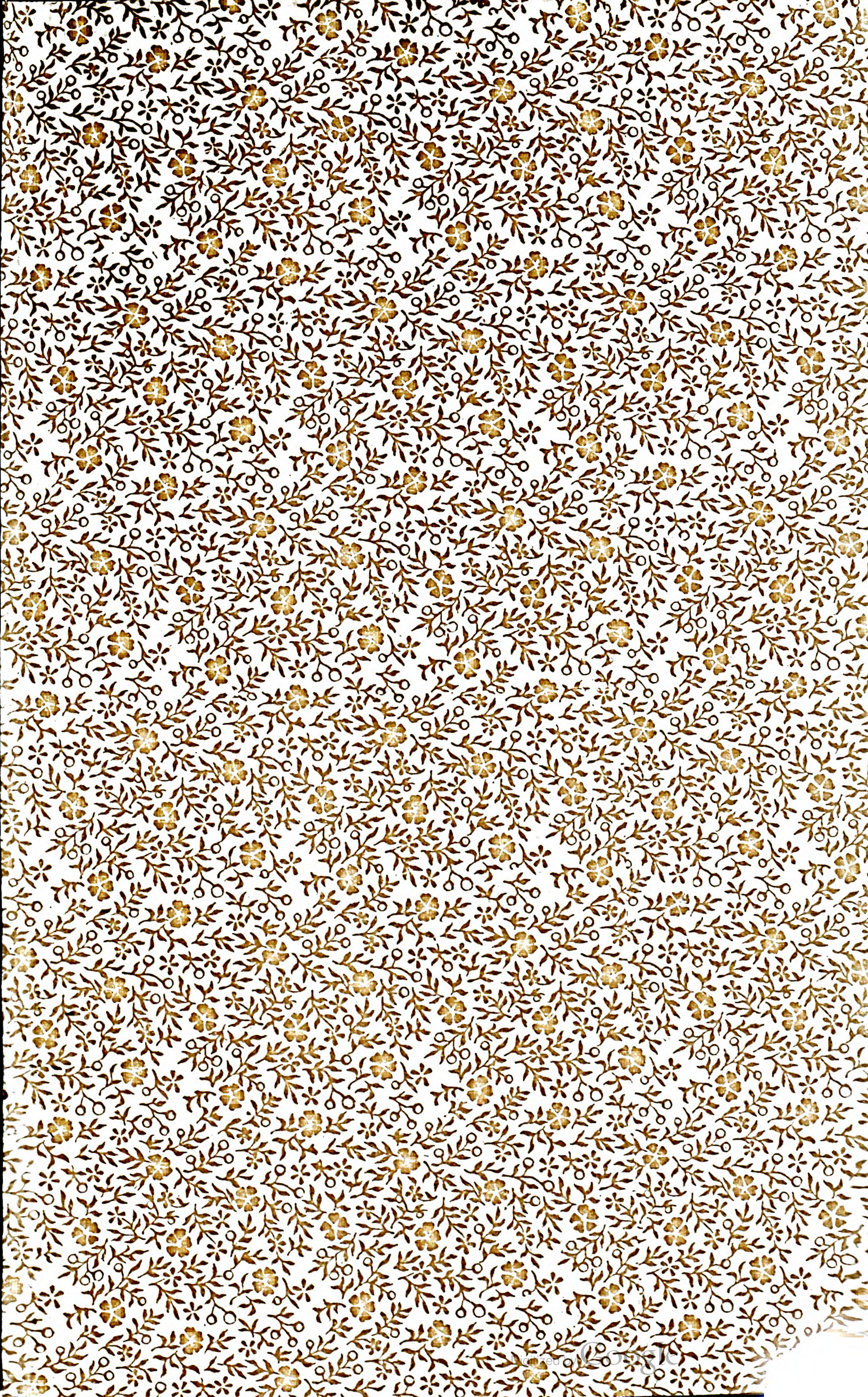

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U.S. DEPARTMENT OF COMMERCE

BUREAU OF FOREIGN AND DOMESTIC COMMERCE

B. S. CUTLER, Chief

SPECIAL AGENTS SERIES—No. 160

CONSTRUCTION MATERIALS AND MACHINERY IN COLOMBIA

BY

W. W. EWING

Special Agent

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LETTER OF SUBMITTAL.

Department of Commerce,
Bureau of Foreign and Domestic Commerce,
Washington, December 15, 1917.

Sir: There is submitted herewith a report on the markets for construction materials and machinery in the Republic of Colombia, prepared by Special Agent W. W. Ewing, whose reports on Cuba and Venezuela have already been published as Special Agents Series Nos. 139 and 144. His future investigations will cover the remaining South American countries. Mr. Ewing finds that American manufacturers have made substantial gains in their sales to Colombia as a result of the war and its dislocation of previously existing arrangements. It is evident, however, that vigorous effort and a painstaking attention to the requirements of this market will be necessary if the present position of the United States is to be maintained after the termination of hostilities. Perhaps in the case of no other South American country is there such need for a study of local conditions. The progress of Colombia is retarded by unsatisfactory transportation methods, inadequate banking facilities, and a lack of the requisite capital for the development of its splendid natural resources. With the gradual elimination of these disadvantages there will come a noteworthy expansion in construction activities and, in consequence, an enlarged market for the articles discussed in this report.

Respectfully,

B. S. Cutler, *Chief of Bureau.*

To Hon. William C. Redfield,
Secretary of Commerce.

MARKETS FOR CONSTRUCTION MATERIALS AND MACHINERY IN COLOMBIA.

I. INTRODUCTION.

AREA, POPULATION, AND PRINCIPAL CITIES.

Colombia is the most northerly of the South American countries. It has an area of 435,000 square miles, equal to the area of the New England, Middle Atlantic, and South Atlantic States (Maine to Florida). It has coasts on the Atlantic and Pacific Oceans. Politically, it is divided into 14 Departments. It is the third nation in South America in population, its inhabitants at the last census numbering 5,472,604. A large part of the people are mestizos, or mixed white and Indian. In addition to these and the pure white inhabitants, there are a considerable number of negroes, mulattoes, and full-blooded Indians. In the first census, made at the time of the colonization of the country by the Spaniards in the year 1770, Colombia had a population of 806,209. In 147 years, therefore, the population has increased by 4,666,395. It has doubled in the last 40 years.

The principal cities, in the order of their importance, follow: Bogota, with a population of 140,000; Medellin, 71,004; Barranquilla, 48,907; Cartagena, 36,632; Cucuta, 20,364; Manizales, 34,720; Bucaramanga, 19,735; Popayan, 18,720; Pasto, 27,760; Cali, 27,747; Santa Marta, 8,346; and Tunja, 8,961. There are other cities of less population but of importance.

The important ports are Riohacha, Santa Marta, Barranquilla, and Cartagena on the Atlantic and Buenaventura and Tumaco on the Pacific.

Bogota, the capital of the Republic, is connected with the sea as follows: First, by 172 kilometers (106.88 miles) of railroad to Girardot; then by 80 kilometers (49.71 miles) in the upper Magdalena River, with steamers of medium size; then by 111 kilometers (68.97 miles) of railroad between Beltran and La Dorada, to avoid the rapids of the river; then by about 800 kilometers (497 miles) in the lower Magdalena, where comfortable steamers of 250 to 300 tons are in use; then by 28 kilometers (17.40 miles) from Barranquilla to Puerto Colombia, which has a pier the second in length in the world—a pier of steel and reinforced-concrete construction that can accommodate four large steamships.

Medellin has access to the Magdalena River at Puerto Berrio by two sections of railroad, with a total length of 174 kilometers (108.12 miles), and a mountain cart road 36 kilometers (22.37 miles) in length, bridging the gap between Cisneros and Botero.

Barranquilla, with a population of 48,907, is the most important manufacturing center and commercial port of Colombia. Puerto

Colombia, the nearest seaport, is about 18 miles distant by rail. The connections via Puerto Colombia are: With New York, Colon, and the West Indies by steamers of the United Fruit Co. weekly; with New York and the West Indies (under normal conditions) by steamers of the Hamburg-American Line (Atlas service); with Colon (normally) by the Hamburg service of the Hamburg-American Line, the Royal Mail Steam Packet Co., the Compagnie Française Transatlantique, the Italian "Veloce" Line, the Royal Dutch West India Line, and the Leyland and Harrison Lines; and directly with southern or Gulf ports in the United States by the two last-named lines and the Seeberg Line. There is also connection with Venezuela, Trinidad, Porto Rico, and Europe.

The Hamburg-American service is now suspended, and that of the other European lines has been irregular during the war. Frequent steamboat service on the Magdalena River connects Barranquilla with Bogota, Medellin, Bucaramanga, and other cities in the interior of Colombia, and there is a daily service, via Cienaga, to Santa Marta.

ECONOMIC ASPECTS OF THE COUNTRY.

There are various national industries, including factories for making Portland cement, hydraulic and common lime, clay products (such as common brick, fire brick, sewer pipe, sanitary pottery, roofing tiles, and glazed wall tiles), concrete sewer pipe, concrete blocks and artificial ornamental stone, plaster of Paris, hydraulic floor tiles (mosaicos), and window glass, as well as small shops for millwork, and mills for cloth making. Of the latter there are 2 in Bogota, 11 in Medellin, and 1 in Barranquilla. The Indians weave by hand considerable wool and cotton, and make the clothes that are used by their people in the country. There are also industries for the manufacture of stearine candles, matches, grass and straw mattings, perfumes, soap, sugar, and beer.

There are mines of gold, silver, platinum, emeralds, and copper in abundance. The exploitation of petroleum has begun, and the prospects for large yields are promising. Asphalt is also to be found, but it has been mined only to a small extent.

On account of the fertility of the soil and the abundance of fish and game, living presents no difficulties. Agriculture is carried on to a sufficient extent to supply food for the country. The products include coffee, wheat, and cacao. At present large quantities of coffee are exported. Flour for the interior is made in the country, but that for the coast is either imported or made from wheat brought in from the United States. There is a considerable industry in stock raising and dairy products.

The language of the country is Spanish. There are banks in all the principal cities, and failures of these institutions in recent years have been rare. The monetary standard is gold, the unit being the peso, which at the present time is about at par. The system of weights and measures is the metric. Colombia is a member of the Universal Postal Union. Patents are granted to all who apply in accordance with the special laws of the country.

In every Department of the Republic there is a governor, minister of public instruction, and public-works board, whose addresses are at the departmental capitals. The national public works are under the direction of the Ministro de Obras Públicas, Bogota, and the national educational system under the Ministro de Instrucción Pública, Bogota.

From day to day the primary schools are becoming more common, and gradually the number of illiterates is being diminished. In all the Departments there are normal schools for the instruction of teachers, and in the Republic there are four universities in which law, political and natural science, mathematics, medicine, and commercial subjects are taught. There are also institutes and academies for the study of music, painting, mechanics, and the science of agriculture.

TOPOGRAPHY.

The topography of the country is extremely irregular. Colombia is crossed by three large mountain ranges—the northern extremities of the Andes. The country has large navigable rivers, such as the Putumayo, the Caqueta, the Arauca, the Meta, and the Orinoco on the east. The Magdalena, which is navigable for about 1,300 kilometers (807.78) miles, forms the principal artery of commerce in the interior, with the Cauca as a principal tributary. There are two other rivers of note, the Sinu, which empties into the Gulf of Morrosquillo, and the Atrato, which empties into the Gulf of Uraba.

At the knot of Pasto, in the southern part of Colombia, the Andes branch off into three ranges, which differ mineralogically and inclose an extensive territory of diversified aspect. Within the tangled confusion of these three ranges, whose industrial value varies according to the geological character of the soil, are to be found the table-lands of mild, springlike climate inviting foreign cultivation and development. At the base of these table-lands are the foothills—of medium climate, of infinite possibilities agriculturally, and of freakish formation, with complex atmospherical conditions. Through the ravines rush torrential streams, of great potential value for power, which, on reaching the spacious valleys, form majestic rivers that aid commerce. In the plains through which these great rivers flow are extensive forests rich in precious woods, balsam, and resin; these, when deforested, would provide immense savannahs for cattle raising. Along the two oceans, distinct in character, are the burning plains of the Tropics, with two coast lines that differ according to the seas which limit them—the one indented and broken, owing to its receiving the full force of the waves; the other straight and uniform, receiving obliquely the current by which it is influenced.

At Pasto, where the three ranges form a knot, there is a table-land of healthful climate 2,000 to 3,000 meters (6,560 to 9,840 feet) above sea level, from which rise the lofty peaks of Cumbal, Galeras, and Patascoy, forming part of the three orographic systems which farther to the north become more clearly defined. On this table-land and its flanks are situated the Department of Narino and part of the Department of Cauca. This table-land is densely populated and has a temperature of 10° to 20° C. (50° to 68° F.), producing potatoes, vegetables, and cereals and possessing pastures for grazing. This table-land is cut by four rivers, which form the principal valleys of the country—the valley of the Patia, falling rapidly to the Pacific

Ocean; the valley of the Cauca, which traverses an extensive territory toward the north; the valley of the Magdalena, which constitutes the axis of the country and which unites the interior with the Caribbean Sea; and the Sibundoy Valley, the origin of the Putumayo, which flows eastward to join the Amazon.

Between the Cauca Valley and the Pacific Ocean there is a chain of mountains that, in its turn, is separated from the ocean by another chain extending from the Isthmus of Panama; between these chains are the valleys of the San Juan and the Atrato, which appear to form one valley known as the Choco. These two ranges are known as the Western Range and the Baudo Range, respectively. The Western Range continues to the north, forming a knot at Parmillo, shooting off into various small branches, and sinking down to the plain of Bolivar, forming the valleys of the rivers Leon, Sinu, and San Jorge, which, like those of the Cauca, San Juan, and Atrato, offer a field for intense industrial activity. At present the most flourishing industries are cattle raising and mining.

Beginning like the Western Range at the table-land of Pasto, another massive range trends northward and sinks finally into the plains of Bolivar. This range is greater than the one just mentioned, and its outstanding features are the following: The plateau of Buey, culminating in the snowy Purace; the plateau of Moras, culminating in the peak of Huila; the plateaus of Barragan and Quindio, separated from each other by the snowy peak of Tolima; the plateau of St. Isabel, whose snowy ridges stand opposite the equally snowy Ruiz, expanding farther on into the highland country of Antioquia and giving off foothills toward the Cauca on the left and the Magdalena on the right, forming at the same time the smaller valleys of the rivers Arma and Nechi, affluents of the Cauca, and those of the La Miel, Nare, San Bartolome, Simitarra, and other smaller affluents of the Magdalena. On the shoulders of this range are high plateaus 3,000 to 4,000 meters (9,840 to 13,120 feet) above sea level, with temperatures varying from 8° to 12° C. (46° to 54° F.), now deserted but adapted to the cultivation of the products of cold countries and to sheep and cattle raising. The lateral spurs of this range toward the Cauca and Magdalena Valleys, and its extremities in the San Lucas hills in the Department of Bolivar, are the regions of mild climate, with temperatures varying from 15° to 25° C. (59° to 77° F.) and adapted to the cultivation of a variety of agricultural products. In Antioquia, furthermore, there are many gold mines. Such is the second range of the Colombian Andes, called the Central Range, which is the seat of the densest population.

On the eastern side of the table-land of Pasto begins another chain of peaks of greater width than the Central and Western Ranges. This range has a width of 100 kilometers (62.14 miles) and contains the peaks of San Francisco, Alcalde, Pattscoy, La Fragua, and others less lofty, continuing thence northward to the snow peak of Sumapaz. From there begins a series of old lake basins extending toward the western side of the range, forming two table-lands, the one from Fusagasuga to Belen de Cerinza and the other from Ubate to Saboya. The mass of this great range, spreading out in this manner, throws off spurs laterally to the Magdalena and the great eastern plain, forming a spacious territory 2,000 to

3,000 meters (6,560 to 9,840 feet) above the sea and inhabited since prehistoric times by a dense population. In addition to this great Andean plateau there is another one of smaller dimensions having an average elevation of 3,500 meters (11,480 feet) formed by the lonely moors of Chipaque, La Carbonera, Toquilla, and Novagotes, culminating in the snowy peaks of Guican. From this point there branches off toward the west a traverse formed by the heights of Almorzadero, Guaca, and Santurban, which become interwoven with the highlands of Santander and form deep valleys containing the numerous branches of the Sarare River, which flows into the Orinoco, the Zulia and Catatumbo, which flow to Lake Maracaibo, and the Lebrija, which flows into the Magdalena. The most western of these highlands, which branches off from the table-land of Jeridas, with the name of Tona and Cachiri, goes to form the Motilones Range and before sinking down to the Goajira Peninsula and the valleys of Cesar and Rancheria connects with the snowy Santa Marta Mountains. In this mountainous region is situated the Department of Santander, which is similar in climate and topography to Antioquia and whose inhabitants are occupied in agriculture in small holdings and the manufacture of straw hats and cotton fabrics.

On the flank of the Eastern Range and from the base of the foothills on its eastern side there extends toward the frontier of Venezuela a vast plain with hot climate, watered by numerous streams that rise and flow toward the great rivers in the heart of South America, the Amazon on the south and the Orinoco on the north. Those that flow to the Orinoco are surrounded by natural pastures which support numerous herds, and those that flow to the Amazon are hedged in with rich forests. The former region is sparsely inhabited by civilized whites and savage Indians, while the latter is peopled entirely by savages.

CLIMATE.

The country has a variety of climates, with temperatures ranging from 39° C. (102° F.) in the plains to the very low marks recorded in regions of perpetual snow.

The climate of the Atlantic coast is influenced by the north winds, which sweep directly over it. The Pacific coast is influenced by the south winds, which strike it obliquely. The Magdalena Valley is influenced by the breezes of the Caribbean Sea, the valley serving as a conduit for the breezes from the sea. The Cauca Valley is influenced by the breezes from the Magdalena Valley, which are received across the mountains of Antioquia, and the breezes from the Pacific Ocean, which cross the Western Range. The plateau of Pasto is influenced by the breezes that blow up the Patia and Mira Valleys on the south, the Cauca Valley on the north, and the Caqueta Valley on the east. The craggy broken ground of Santander, forming the watershed between the Magdalena and Lake Maracaibo, has a climate similar to that of Antioquia. The eastern plain has a climate typically tropical in character, owing to the absence of high mountains. Lastly, there is the climate of the long table-land of Boyaca and Cundinamarca, only one corner of which (Bogota) has been studied.

Bogota is situated 2,600 meters (8,530 feet) above sea level. The climate is damp and cold. The cold of Bogota is the cold of high altitudes; at 15° C. (59° F.) one feels colder in Bogota than at 4° C. (39° F.) in New York, because of the rarefaction of the air. This is why pneumonia is common. Water boils at 91° C. (196° F.).

There are four well-marked seasons, two dry and two wet. The first dry season is, in general, from the middle of December to the middle of April. The end of December and the month of January constitute the true dry season, although rarely in Bogota is the sky without clouds. The temperature of these months is mild and the sun strong. The first rainy season is from the middle of April to the end of June. In April and May the rains are frequent. In June they diminish and consist of a "drizzle," which the people in Bogota call "paramos," half rain and half mist. The second dry season is from July to October, but this season is not so summerlike as the January season. July is the coldest month in the year. Although dry, it is usually cloudy and so cold that it feels like November in the Temperate Zone. August is the month of wind, with the return of the north breeze. The second rainy season is from October to the middle of December. It is not so cold as July, but there are rains almost incessantly, especially in October and November.

In addition to the above, Bogota is more subject than other regions to the variations that the periods of solar activity exercise over the terrestrial globe. Every 11 years the dry and rainy seasons are notably accentuated. It is not to be wondered at that the rainy seasons which correspond with the solar activity are accompanied by seismic phenomena. In the period of 1905 and 1906 the submersion of the island of Gorgona in the Pacific Ocean took place at the same time as the San Francisco earthquake.

Storms were frequent in Bogota in former days, and accidents from lightning were not uncommon. These accidents have now diminished with the construction of railroads, telephone and telegraph lines, and electric-lighting systems, all of which exercise great absorbing power over electricity.

Weather conditions in the Caribbean coast region are indicated by the following statistics of rainfall and temperature, representing the records during the past five years at the Barranquilla observatory:

Years.	Rainfall.		Temperature.					
			Maximum.		Minimum.		Mean.	
	Millimeters.	*Inches.*	*°C.*	*°F.*	*°C.*	*°F.*	*°C.*	*°F.*
1912	665.77	26.2	36.2	97.16	19.1	66.38	28.13	82.63
1913	478.02	18.8	36.4	97.52	20.1	68.18	27.53	81.55
1914	398.09	15.67	35.7	96.27	20.8	69.45	27.29	81.12
1915	1,018.01	40.08	36.3	97.34	21.3	70.34	28.17	82.71
1916	1,591.06	62.64	35.2	95.36	20.1	68.18	27.28	81.10

MEANS OF COMMUNICATION.

RIVER NAVIGATION.

Colombia is divided into nine hydrographic regions. In the first class are the three great rivers Magdalena, Orinoco, and Amazon, in the second the Patia, San Juan, Sinu, and Zulia, and in the last the two coast regions. All the rivers are navigable to a greater or less extent. The chief waterway of the country is the Magdalena. Its bed varies from 800 to 1,600 meters (2,625 to 5,249 feet) in width, with an average depth of 10 meters (32.8 feet). On its banks there are 40 towns and villages, including Barranquilla, the chief port of the country.

The Magdalena is divided into two parts, the upper and the lower, by the rapids of Honda. The upper Magdalena has 64 leagues navigable between Neiva and Honda, and the lower 209 leagues between Honda and Barranquilla. The rapids prevent continuous navigation, and their elimination would be difficult. The Magdalena drains practically the whole Andean watershed of Colombia. The valley of the Magdalena widens from south to north. At Banco the Central Range of mountains terminates and the Eastern Range turns off to the northeast, and at this point the river valley widens out into the great plains of the Departments of Magdalena, Bolivar, and Atlantico. Although the valley widens, in general, from south to north, this tendency is not uniform; it widens and narrows according as the mountains approach or recede from the river.

Steamboat navigation exists on the upper and lower Magdalena and its affluents Lebrija, Bajo Cauca, Sogamoso, Nechi, and San Jorge, as well as on the Atrato, Sinu, upper Cauca, Patia, and Telembi. The fluvial taxes, amounting to $400,000 per year, are devoted to the improvement of these rivers. For cleaning the Magdalena there are three dredges, one for the exclusive local use of Barranquilla and two that have their own locomotion and in the dry season pick up snags and tree trunks. These dredges have an auxiliary fleet of scows, barges, etc.

There is a project for constructing a wharf in Girardot to facilitate the handling of freight. The character of the upper river is entirely different from that of the lower; the banks of the upper portion are of rock, and therefore the channel does not vary so much as in the lower section, where the banks are low and of soft earth. These circumstances constitute perhaps the greatest obstacle to the work of canalization or regulation that the river requires. The flow of water is sufficient for boats of the present draft. In the upper Cauca there is a dredge, but it does not give service, and the same is true in the Sinu River, where another small dredge is installed.

The Government of Colombia is considering the advisability of arranging with two hydraulic engineers from the Netherlands to make the necessary studies for regulating and canalizing the rivers of the country.

The presence of a sand bar at the mouth of the Magdalena (Bocas de Ceniza) prevents steamers from coming into the river. As it is of great importance that steamers should be enabled to enter so as to reach Barranquilla, the Government contracted with the Julius

Berger Aktiengesellschaft, of Berlin, to make plans for deepening and canalizing the Bocas de Ceniza. The German firm fulfilled its obligations and gave the plans to the Government, but owing to the war the work has not been carried out.

Laws 73 of 1913 and 36 of 1915 provide for a loan for the execution of the work; for the payment of the interest there are to be set aside five units of the customs at Barranquilla and all port dues at Barranquilla (Law 77 of 1912).

RAILWAYS.

The following table shows the extent and the gauge of the railways in Colombia:

Railways.	Extent of lines.		Gauge.
	Kilometers.	*Miles.*	
Ferrocarril de Amaga	37	22.99	1 yard.
Ferrocarril de Antioquia	174	108.12	Do.
Ferrocarril de Barranquilla	28	17.40	Do.
Ferrocarril de Cartagena	105	65.24	Do.
Ferrocarril de Cucuta	72	44.74	1 meter.
Ferrocarril de La Dorada	111	68.97	1 yard.
Ferrocarril de Girardot	132	82.02	Do.
Ferrocarril de Norte	62	38.52	1 meter.
Ferrocarril de Pacifico	233	144.78	1 yard.
Ferrocarril de Puerto Wilches	20	12.43	1 meter.
Ferrocarril de Santa Marta	159	98.80	1 yard.
Ferrocarril del Sur	34	21.13	1 meter.
Ferrocarril de Sabana	40	24.85	Do.
Ferrocarril del Tolima	30	18.64	1 yard.
Ferrocarril del Manizales	10	6.21	Do.
Total	1,247	774.84	

As an example of the gross revenue, operating expenses, and net earnings of railways in Colombia, the following figures concerning the Ferrocarril de Antioquia may be of interest:

Years.	Nus section.			Porce section.		
	Gross revenue.	Operating expenses.	Net earnings.	Gross revenue.	Operating expenses.	Net earnings.
1913	$590,278	$342,453	$247,825	$115,850	$113,580	$2,270
1914	525,609	321,258	204,351	227,721	209,234	18,487
1915	519,672	231,167	288,505	253,703	158,121	95,582
1916	714,830	287,907	426,923	322,632	182,131	140,501

Specifications for future railroad construction are as follows:

Single track with sidings according to traffic requirements, 1-meter gauge.

Maximum grade, 3 per cent, compensated on curves.

Minimum radius of curvature, 80 meters (262.4 feet) on line and 50 meters (164 feet) on sidings.

Between two opposing curves there must be a tangent of not less than 30 meters (98.4 feet).

The limits fixed for curves, grades, and tangents are not to be construed by concessionaries or constructors as averages, but are limits to be used only in exceptional cases.

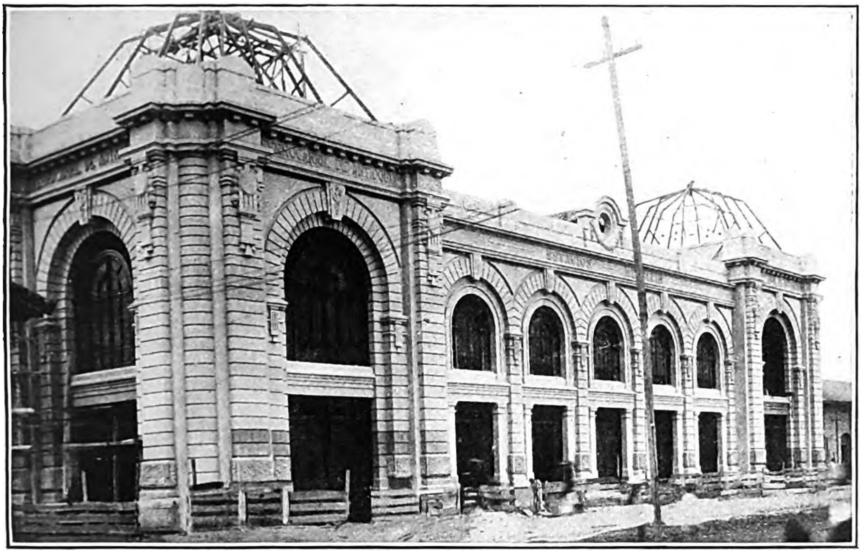

FIG. 1.—CENTRAL STATION OF THE ANTIOQUIA RAILROAD IN MEDELLIN, COLOMBIA.

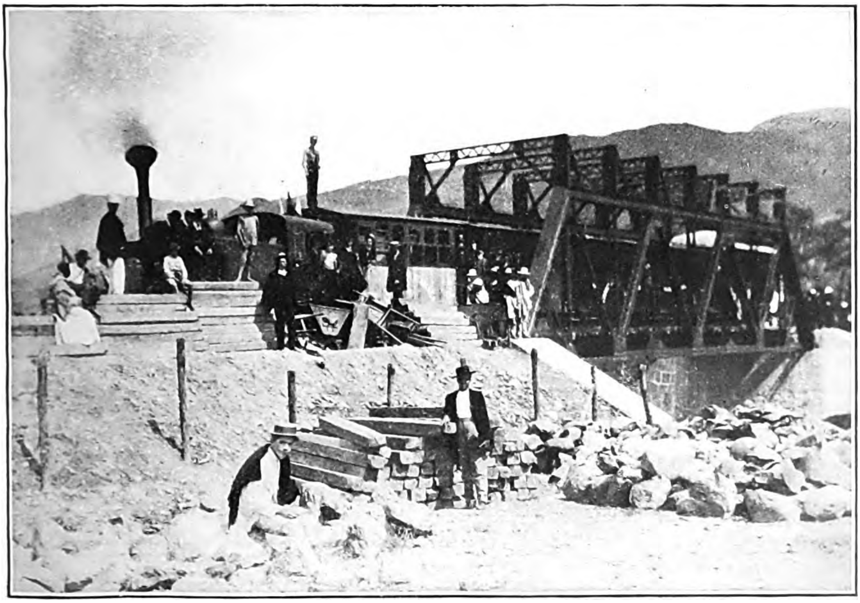

FIG. 2.—STEEL BRIDGE OVER PORCE RIVER, AMAGA RAILROAD.

This bridge was transported over the mountains on mules

Changes of grades must be conveniently effected by vertical curves. Changes of grade on horizontal curves must be avoided.

On curves the outside rail must have a superelevation corresponding to a velocity of 30 kilometers (18.64 miles) per hour. Straight stretches of track must approach curves by means of convenient transitional curves.

Before leveling in forest country, timber must be cleared 20 meters (65.6 feet) on each side of center of track, and heavy trees that menace the track must be felled, no matter what their distance from the track may be.

When the track is on the side of a mountain, clear 25 meters (82 feet) above and 15 meters (49.2 feet) below center of track.

Width of base will be 4 meters (13.12 feet) at bottom of cuts, including ditches, and 3 meters (9.84 feet) at top of graded track.

Slope of cuts must be as follows: In hard rock necessitating explosives, one-quarter to one-fifth of base to one of height; in soft rock, one-third of base to one of height; in hard earth without filtrations, one-half of base to one of height; in sand or gravel, one and one-half to two of base to one of height.

Slope of roadbed must be: With sandy or ordinary soil exposed to action of water, two or three for one; with earth not exposed to the action of water, one and one-half for one; with stone placed by hand, three-quarters or one-half for one.

In no roadbed may there be ditches with less than 60 centimeters (1.97 feet) to 1 meter (3.28 feet) of berm, according to height.

Ditches in cuts must be parallel to the axis of track and must have a slope of one-half of base to one of height.

In constructing the line along river valleys, ravines, etc., the base of the roadbed must be higher than high-water mark, and where this is not possible retaining walls must be built to prevent washouts. This must be done wherever the roadbed is exposed to attack from water. All work of this kind must be of a permanent nature, so only first-class materials must enter into the composition, such as iron, stone, brick, etc.

In the case of important structures, such as station buildings, bridges of more than 10 meters (32.8 feet) span, etc., all plans must be approved by the minister of public works.

In retaining walls, bridge abutments, etc., faced stone must be used so that all parts present a smooth surface. The copings of walls must have a convenient slope.

Ballast for track must be of crushed stone or rubble of good quality, with a thickness of not less than 20 centimeters (7.87 inches) below the crossties, must rise to the level of these, must be of such nature as to distribute the pressure of the trains over the rails, and must be porous, to keep the ties dry.

Ties must be of guayacan or any long-lived wood without cuts or whiteness and conveniently worked, or of iron or steel, at discretion of constructor. They must be 2 meters long, and if of wood must be 20 centimeters (7.87 inches) in width and 15 centimeters (5.9 inches) in thickness. The number of ties per kilometer (0.62 mile) must not be less than 1,650.

Rails must be of good-quality steel of the Vignolle type and of a minimum weight of 45 pounds per yard. Rails must be fastened to ties by means of spikes or screws, and joints must be of angle bars, with a resistance in each pair conforming to established technical rules and having the usual coefficient of safety for the operation of the heaviest engine on the line. Angle bars must have grooves equidistant from the center, to receive the spikes, in order to prevent the track from spreading. Each joint must have four bolts with steel washers, so that the trepidation produced by trains will not loosen the nuts. Rail joints must be opposite to each other on straight track and between ties.

Grades and curves must allow of the heaviest locomotive in the service pulling a weight of 100 tons at a minimum velocity of 30 kilometers (18.64 miles) per hour.

Necessary drains and waterways must be made to keep track in good condition.

On road crossings, whether public or private, passageways must be made either overhead or underneath so as not to disturb the traffic, and in the case of grade crossings guard rails must be provided, with gates or barriers for the security of the public.

In the terminal stations at the ends of the line the construction shall be of masonry, with tile or metallic roofing. At intermediate points secondary construction shall be provided to meet the approval of the supervising engineer.

The rolling stock must consist of at least one engine, three passenger cars, and six freight cars per kilometer (0.62 mile) of road. Passenger cars, in addition to being solid and safe, must be comfortable and decent.

Tunnels must be sufficiently wide to permit trains to pass without injuring workmen who might be in the tunnel.

On swampy ground macadam roadbeds must be made, or pontoons supported on iron girders or masonry.

PUBLIC HIGHWAYS.

The roads and trails of Colombia are divided into three groups—national, departmental, and municipal. The national highways are 8,603 kilometers (5,346 miles) in length. With regard to the other two classes there are no reliable data.

The national highways are those that unite the capital with the frontier and strategical points, those that lead to regions for colonization, and those that unite the Department capitals with river or sea ports. The principal ones are as follows:

The Central Northern Highway from Bogota to Cucuta, via Tunja, Tequia, Malaga, Chinacota, and Pamplona, with 270 kilometers (168 miles) in service.

The highway from Cucuta to the Magdalena, partly under construction and partly under survey.

The Southwestern Road, destined to unite Bogota with the extreme southern part of the country, passing through Ibague, Calarca, Tulua, Popayan, and Pasto; this has some sections in service and others in construction.

The road from Pasto to Puerto Asis by the Putumayo River, passing through the villages of San Francisco and Mocoa, two-thirds of which is constructed.

The Northeastern Road from Bogota to Gamarra above the Magdalena River, passing through Chiquinquira, El Socorro, and Bucaramanga, some parts of which are cart roads that it is planned to improve from time to time.

The Sarare Road between Pamplona and Tame, destined to unite the northern part of the Department of Santander with the plains of Casanare; part constructed and part under survey.

The Eastern Road destined to unite Bogota with Calamar on the River Unilla (an affluent of the Vaupes in the Meta country), passing by Villavicencio and San Martin; this road is in service to Villavicencio and in survey from there on.

The Quibdo Road on the Atrato in the Intendency of Choco to the city of Bolivar in the Department of Antioquia.

The Guadalupe Road in the Department of Huila to a point on the River Orteguasa via Florencia; all in service.

The Yarumal Road from Yarumal in the Department of Antioquia to Monteria in the Department of Bolivar; projected.

In addition to the above, which are classed as preferential, there are many others of equal importance covered by ordinance No. 422 of 1917.

The law assigns to public highways $700,000 per year, which is paid by 5 per cent of the customs dues. This fund is called the special road fund. Conservation of roads is provided for by road taxes.

Departmental roads are financed by road taxes levied by the departmental governments within the Departments. The amount of these taxes may be estimated at $50,000 per year for each section. Municipal roads are financed by the municipalities from local taxes and amount to about $500 per year for each municipality.

The technical conditions called for in all new roads are as follows: First-class roads—Maximum grade, 6 per cent; minimum radius, 30 meters (98.4 feet); minimum tangent, 20 meters (65.5 feet). Second-class roads—Maximum grade, 8 per cent; minimum radius, 20 meters (65.6 feet). Third-class roads: Maximum grade, 10 per cent; minimum radius, 15 meters (49.2 feet).

The road system is mostly in mountainous country of high relief, as the towns are usually situated on the plateaus or slopes of the Andes, the three ranges of which traverse the country from south to north and at many points reach above the line of perpetual snow.

The cost of highway construction in the mountains, the road having a base of 8 meters (26.24 feet) and wearing surface of 5 meters (16.4 feet), with macadam 18 centimeters (7.09 inches) thick, varies from $5,000 to $16,000 legal gold per kilometer ($4,808 to $15,384 United States currency, with exchange at $1.04), equivalent to $7,741 to $24,768 per mile.

Macadam costs $0.40 per square meter, or $0.318 per square yard, with exchange at $1.04, hand hammers being used for breaking the stone.

Machinery is beginning to be used in road making, with good results, and there are in use several stone crushers, excavators, and steam tractors of English manufacture belonging to the Government.

The country is rich in silicious and calcareous rock.

Labor is abundant in the cold country and scarce in the hot. Wages range from $0.22 to $0.35 per day in the cold country, and from $0.40

to $1 per day in the hot and unhealthful regions. Foreman masons, blacksmiths, and carpenters receive from $0.80 to $1.60 in the cold country, and $1.50 to $3 in the hot.

There are no laws as to what constitutes a day's labor, but the custom is nine hours in the cold and seven hours in the hot country. Laborers in the cold country are strong, energetic, sober, and obedient; in the hot country they are not so satisfactory.

The roads partly in service and partly under construction follow: Central Highway of the North, Bogota to Cucuta; Cucuta to the Magdalena; Pasto to Barbacoas; Tunja to Puerto Aquileo by the River Carare; Santander (Cauca) to San Julian, the port on the Cauca; Carmen (Bolivar) to Zambrano; Bogota to Cambao, the port on the Magdalena; Alban to the lower Magdalena; Tolu to Sincelejo; Bogota to Fusagasuga via Sibate; Highway of the Northeast, Bogota to Chiquinquira. The great Central Highway of the North is constructed as far as La Paz, and the plans are made as far as Capitanejo on the border of the Department of Santander, representing approximately 100 kilometers (62 miles) more. Close to this road are to be found iron, lime, coal, building stone, etc. This highway, when completed, will connect Bogota with the Venezuelan frontier.

MATERIALS USED IN PUBLIC WORK.

The materials used in public work have the following present prices:

Adobe, brick baked in the sun, $6 per 1,000 legal gold ($5.66 United States currency[1]).

Beams, common, 5 meters by 0.20 meter by 0.12 meter (16 feet 5 inches by 8 inches by 5 inches), $2 per piece ($1.89 United States currency); same beams, 6 meters (19 feet 8 inches) long, $2.40 per piece ($2.26 United States currency); same, 7 meters (23 feet) long, $2.80 per piece ($2.64 United States currency); same, 8 meters (26 feet 3 inches) long, $3.26 per piece ($3.02 United States currency).

Brick, fire, $30 per 1,000 ($28.28 United States currency).

Brick, flat, for paving floors in houses, size 9¾ by 9¾ inches, $25 per 1,000 ($23.58 United States currency).

Brick, hard burned, $13 per 1,000 ($12.26 United States currency).

Brick, ordinary, medium burned, $12 per 1,000 ($11.32 United States currency).

Brick, salmon, $10 per 1,000 ($9.43 United States currency).

Cement, imported Portland, in Bogota, $70 to $75 per ton ($12.70 to $13.61 United States currency per barrel of 400 pounds gross).

Cement, Portland, made in Bogota, $50 per ton ($8.50 United States currency per barrel).

Coal, lump, $9 per ton ($7.70 United States currency per ton of 2,000 pounds).

Gravel, $1.60 per cubic meter ($1.15 United States currency per cubic yard).

Gypsum, first class, $80 per ton of 2,240 pounds ($7.56 United States currency per barrel of 250 pounds). Second class, $64 per ton of 2,240 pounds ($6.85 United States currency per barrel of 250 pounds).

Iron, $10 per quintal (100 pounds of 500 grams each), or $0.0856 United States currency per pound, equal to $171.20 per ton of 2,000 pounds.

Lead, white, $8.50 per arroba (25 pounds of 500 grams each, or 27.56 pounds avoirdupois), equal to $0.291 United States currency per pound.

Lime, hydrate of, $13.60 per ton ($11.58 United States currency per ton of 2,000 pounds).

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[1] In converting the prices given in Colombian legal gold into equivalent values in United States currency, $1.06 has been used as the rate of exchange. The first figures are in Colombian legal gold, while the United States equivalents are shown in parentheses.

Lime, hydraulic, in Bogota, $40 per ton ($34.24 United States currency per ton of 2,000 pounds).

Lime, live, $50 per ton ($42.80 United States currency per ton of 2,000 pounds).

Nails, $14 per quintal ($0.12 United States currency per pound avoirdupois).

Oil, linseed, $3 per gallon of 5 bottles ($2.83 United States currency per gallon).

Planks, fine, $0.70, $0.80, $1, and $1.20 per piece ($0.66, $0.75, $0.94, and $1.13 United States currency).

Planks, ordinary wooden, 2.40 meters by 0.40 meter by 0.025 meter (7 feet 10½ inches by 1 foot 4 inches by 1 inch), $0.45 per piece ($0.425 United States currency).

Roofing, metal, 2.15 meters by 0.85 meter (7.05 by 2.79 feet), $2.30 per sheet ($2.17 United States currency).

Sand, from the side of the mountain near Bogota, $2 per cubic meter ($1.44 United States currency per cubic yard).

Sandstone, for the fronts of buildings, $0.02 per cubic decimeter ($0.54 United States currency per cubic foot.)

Scantlings, $0.45 to $0.60 per piece ($0.42 to $0.57 United States currency).

Stone, broken, for concrete, $1.80 per cubic meter ($1.30 United States currency per cubic yard).

Stones, first-class footing, for foundations, $5 per 100 ($4.71 United States currency).

Stone for covering drains, measuring 1 foot by 2 feet 7½ inches by 6 inches thick, $14 per 100 ($13.21 United States currency).

Tiles, ordinary clay roofing, Spanish pattern, $25 per 1,000 ($23.58 United States currency).

LABOR CONDITIONS.

On the coast the labor is native, with the exception of that employed by the United Fruit Co. As a rule the character of the labor in the coast cities is not satisfactory for construction work, since the men can not always be depended upon. The climate has an adverse effect on their energy and their disposition to perform day or task work. The rates of pay of these men follow: Laborers, from $0.30 to $0.50 per day; masons, from $0.80 to $1.50 per day; carpenters, from $0.80 to $2 per day; modelers, decorators, and other mechanics, from $1.50 to $5. The average working-day in Colombia consists of eight or nine hours' actual work. The efficiency of the labor of all classes is low. It apparently makes little difference to the men, especially on the coast, whether they work at a daily rate or by task. They seem content if they earn enough to pay for their food, clothes, and beverages. The laborers on the coast do not depend on their work for a living, since their food consists chiefly of different dishes of prepared corn, plantains, and yucca, which nearly every laborer grows on his own little piece of ground or can obtain from his neighbor if he has none of his own. No attempt has been made to introduce foreign labor on a large scale for construction work. The Girardot Railroad and the Pacific Railroad, two of the largest engineering enterprises in Colombia, were built by native labor and the soldiers who were loaned by the Government, all working under the direction of American and English engineers, who surveyed and constructed the lines.

The rates of pay for the workmen employed on projects that are carried out by the department of public works are as follows: Skilled workmen, first class, $0.90 per day, legal gold ($0.85 United States currency); skilled workmen, second class, $0.80 per day, legal gold ($0.75 United States currency); skilled workmen, third class,

$0.60 to $0.70 per day, legal gold ($0.57 to $0.66 United States currency); laborers of the first class, $0.45 per day, legal gold ($0.42 United States currency); laborers of the second class, $0.40 per day, legal gold ($0.38 United States currency); laborers of the third class, $0.30 per day, legal gold ($0.28 United States currency).

The yearly apportionment for public work carried out under the direction of the minister of public works is $250,000 legal gold, or (with exchange at $1.06) $235,849 in United States currency.

In Medellin the masons, bricklayers, and plasterers on city building work receive from $1 to $1.40 per day, legal gold ($0.94 to $1.32 United States currency); masons' helpers $0.80 per day, legal gold ($0.75 United States currency); and laborers $0.50 per day, legal gold ($0.47 United States currency).

On Government railroad work in Antioquia the native labor has the following rates: Common labor, from $0.40 to $0.80 legal gold ($0.38 to $0.75 United States currency) per day for 9 or 10 hours' work; masons and carpenters, $2 legal gold ($1.89 United States currency). On private railroad work in Antioquia (for fair labor) the rates are: Common labor, $0.50 legal gold ($0.47 United States currency); masons and carpenters, $1 legal gold ($0.94 United States currency), or, if workmen are extra good, $1.20 legal gold ($1.13 United States currency); blacksmiths, $1.10 legal gold ($1.04 United States currency). The working-day on the private railroad work is 10 hours. There is a notable difference in the prices of skilled labor on the Government and on the private railroad work.

The Republic of Colombia has a law providing for compensation in the case of labor accidents for which the employer is clearly responsible. The term "laborer" as used in the law means anyone whose salary does not exceed $6 per week. Where temporary incapacity results, the employer is to provide necessary medical attention and pay two-thirds of the daily wage during the period of incapacity. In the case of partial permanent incapacity, the compensation takes the form of medical attention and the full daily wage for a minimum of 90 or a maximum of 140 days. If the laborer is permanently incapacitated (a cripple for life), he is to receive medical attention and a year's wages. If the accident results in the death of the laborer, his heirs are to be paid one year's wages. In place of compensation, employers are at liberty to substitute insurance (at their own expense) in some reputable accident insurance company.

MINERAL RESOURCES IN GENERAL.

Considerable deposits of oil are said to exist in the Departments of Atlantico and Santander, while copper, guano, and talcum are reported to be present in Santander, Magdalena, and Goajira. Owing to the lack of a geological study of the country it is impossible to state precisely where the mines are, but they are known to exist. The ministry has no information concerning the ownership of the oil lands, but it must be stated that oil deposits belong to the nation if they are on Government land or on land that may have belonged to the State since October 28, 1874. On this account great care must be taken in purchasing mining lands from private parties, who may be legitimate owners of the land but have no subsoil rights.

The laws regarding the exploitation of oil are not clearly defined, but this matter is receiving the attention of the Government.

The Fiscal Code authorizes the exploitation of other materials, such as guano, coal, nitrate, phosphates, etc., in accordance with article 4–110 and decree No. 435 of 1916.

Exploitation of the coal mines is suspended while the geological studies of the coal regions are being made, but as soon as the Government is in possession of the necessary data, it will be able to grant concessions for their development. The scientific commission that has in hand the geological study of Colombia is already organized, and in due time the results of its work will be made public and the mineral wealth of the country will be recorded and valued.

The gold and silver mines are being extensively worked in the Departments of Antioquia and Caldas and in the Intendency of the Choco. The output of these mines may be studied in the periodical reports of the Colombian Congress; these show the number of mines, the mineral they produce, the names of the owners, etc.

It is the intention of the Government to secure the passage of a law authorizing the granting of concessions for the development of the auriferous wealth that exists in the river beds.

COAL DEPOSITS.

Coal in Colombia is not found in the Carboniferous formation, properly so called, but in the Cretaceous and Tertiary formations.

In the great eastern Cretaceous zone, which covers the whole of the Departments of Cundinamarca and Boyaca and part of Huila and Santander, coal is found in the high regions, and on that account it has been found in the savannah of Bogota. In that region it has been worked in various localities—Tequendama, Nemocon, Tibito, La Predara, Pacho, Zipaquira. Farther to the north it has not been located, doubtless because the western slope of the Eastern Range, where the coal ought to be, is covered with forest and has not been explored. The coal of this region is generally good "hulla," which produces coke, and in some places lignite of the best quality is found. The latter does not produce coke. This variation in the quality of coal is due to the metamorphosis it has undergone. Where the veins have been little compressed the coal is lignite, but where it has been doubled up, raised, and otherwise affected by eruptive rocks the material is "hulla." This is best seen in the western Cretaceous zone or Antioquia.

The western Cretaceous zone is much less extensive than the eastern, as it occupies only a long narrow strip, beginning at the boundary of the Department of Bolivar, traversing the Department of Antioquia, and terminating in the Department of Valle in a narrow strip extending to a point a little south of Cali. It may be said that wherever this formation is found there is coal, although the number and the thickness of the veins vary. It must be borne in mind that from Riosucio to Cali this formation has suffered many interruptions by erosion. In this zone coal has been worked in Amaga, Heliconia, Titiribi, Armenia, Fredonia, Riosucio (now called Hispania), and Cali. The workings here, as in the eastern zone, are insignificant, and it may be said that the deposits are intact.

In the western zone the true "hulla" is scarcer than in the eastern, being found only in Armenia, Titiribi, and Riosucio. On the other hand, this is the coal most easily exported to the Caribbean Sea and to the Pacific—to the Caribbean because there are good deposits in Caceres and in Ure, where the rivers Cauca and San Jorge are navigable, and because a relatively short railway could carry the "hulla" or coke of Armenia, Heliconia, and Titiribi to the Gulf of Uraba; to the Pacific because the railroad that unites the seaboard with Cali is now finished. Although the coal that has been found in Cali is not of the best quality, it is thought that deeper down it will improve; and in any case the excellent "hulla" of Riosucio and Quinchia could be carried in boats by the Cauca River to Cali.

The number of layers workable in both Cretaceous zones varies from one to six; their thickness varies from 2 to 6 feet, and an average of 3 feet might be adopted.

The coal of the Tertiary formation is generally considered to be a lignite. The deposits are found near the Caribbean Sea between the Gulf of Uraba and Cartagena, and also about 100 miles from the coast in the neighborhood of Santa Marta and Cienaga. The layers are from 2 to 5 feet thick.

In the Department of Magdalena, near a place called Villa Nueva, the outcroppings of coal are reported to be of a superior grade and to analyze the same as Pocahontas. It is good coal, and the railway is already surveyed from Riohacha to the coal deposits.

The analysis of the coking coal is as follows: Humidity, 1.4 per cent; volatile material, 35.58 per cent; fixed carbon, 58.54 per cent; ashes, 4.48 per cent; British thermal units, 14,145.

The analysis of the good lignite is: Humidity, 11.75 per cent; volatile matter, 39.86 per cent; fixed carbon, 46.6 per cent; ashes, 1.79 per cent; British thermal units, 10,537 to 11,000.

The analysis of the coke is: Fixed carbon, 89 per cent; ashes, 10.4 per cent; sulphur, 0.6 per cent; calories, 7,448.

The following notes are based on the observations of one of the Government engineers located in the Amaga district, who has made a special study of the particular district. There are said to be five veins of lignite in the Amaga district, the deposit being bounded thus: On the north it extends to Angelopolis, on the south to Venecia and Fredonia, on the east to the foot of the eastern spurs of the Central Range ("La Paja" y "Cedron"), and on the west to the foot of the Piedra Pelona Mountains, a little higher up than the village, following the Amaga ravine up to the quebrada "La Clara" and extending from there to the Honda ravine. In reality there are six veins, but one of them is not counted, as it is only 1 meter thick and contains much ferruginous fossil and very little coal.

The area occupied by the Carboniferous formation in the Department of Antioquia is 6 square kilometers (2.32 square miles).

The five veins above mentioned have the following thickness: Vein No. 1, 2.5 meters; vein No. 2, 1.5 meters; vein No. 3, 0.6 meter; vein No. 4, 0.85 meter; vein No. 5, 0.8 meter; total thickness, 6.25 meters (20 feet 6 inches). Allowing 0.7 meter for inequalities in veins Nos. 2 and 4, there remains a total thickness of 5.55 meters (18 feet 2½ inches). The latter thickness multiplied by 6 square kilometers of area gives a total of 33,300,000 cubic meters, or approximately as many tons.

The analysis of the Amaga coal is as follows: Vein No. 1, without drying—Humidity, 11.14 per cent; volatile matter, 45.15 per cent; fixed carbon, 41.92 per cent; ashes, 1.79 per cent; sulphur, 0.33 per cent; British thermal units per pound of coal, 11,061. Vein No. 2, without drying—Humidity, 11.37 per cent; volatile matter, 44.41 per cent; fixed carbon, 43.07 per cent; ashes, 2.45 per cent; sulphur, 0.5 per cent; British thermal units per pound of coal, 10,950.

PETROLEUM PROSPECTS.

The principal known seepages of petroleum in Colombia are along the coast from Puerto Arboletes in the west to the mouth of the Magdalena; they are found chiefly in the Sinu River near Lorica, San Sebastian, Cocarilla, and El Viento. In the three last-named places American interests have drilled three wells to depths from 1,800 to 2,200 feet. They have obtained oil in the San Sebastian at 2,000 feet and in the Cocarilla at 1,800 feet. At El Viento the drilling was discontinued without obtaining oil. The drilling was discontinued in all three places on account of a disagreement with the parties with whom the options were held.

At Arboletes there are great seepages, but no drilling has as yet been done. Farther away from the coast in the Sinu district seepages can be found as far as 200 miles up the river in the foothills of the western Cordillera. To the east, near Amaya, which is on Cispata Bay (into which the Sinu River empties), an American interest has a distribution headquarters. This point is now deserted, except by a watchman. Farther east along the coast from Amaya there are seepages in Tolu, on Morrosquillo Gulf. Still farther east, near San Antonio, there are seepages of heavy oil, of asphaltic base; also on the Dique, which is an arm of the Magdalena, similar seepages are found. In the Department of Bolivar, about 20 miles from Cartagena, are a series of volcanoes that produce gas and brackish water. Near these volcanoes the Cartagena Oil Refining Co. has drilled wells, one of which reached a depth of 2,540 feet, with good indications of oil. The hole had to be abandoned because of the loss of the tools, which it was impossible to remove. Farther east there are seepages near Bayunca and Guayepo. All the latter coast lands are under contract by an American company.

Near Savanilla a Canadian company has done a great deal of drilling and obtained a small quantity of very fine oil in one of its wells. For the last two years operations have been suspended, though of late this company has been doing some further work.

Along the Magdalena River from Banco south there are oil seepages on both sides of the river, principally on the east bank. Operations are carried on near the River Carare by Pittsburgh interests. At present they have one well down 480 feet, with good indications. All of their land is dotted with seepages, some of the oil being of very high grade.

Farther south on the same side of the river, near Honda, Girardot, and Ambalema there are seepages; one of these, on a ranch called Prima Vera, is especially large, with pools of heavy oil. There has been no operation of the properties up the river. Most of these are held by an American company.

On the eastern slope of the Cordillera Oriental is a very large tract of land called the Barco concession, comprising 1,250,000 acres, which has recently been examined by American interests. The largest seepages in all Colombia are said to be on this concession; they are reported to be so prolific that the original owner felt justified in building a small refinery for local business. This oil is of good grade—about 38° Baumé. It is assumed that if this tract of land is made accessible it will become a large producer of oil. Adjoining this concession on the northwest is a tract of land called Buena Vista, containing about 800,000 acres.

On all these last-mentioned properties it was expected that development work would begin about July, 1917.

SUGAR FACTORIES.

Sugar production is very backward in Colombia. In the greater part of the country only "panela," or brown sugar, is manufactured. The poorer people use the "panela" almost entirely, the better grades of sugar being a luxury with them. The principal use for sugar is for making sweetmeats, chocolates, aerated waters, and sirups. In the Department of Santander a large part of the sugar there produced is used in the manufacture of guava jelly, an industry peculiar to that region.

Of sugar factories, properly so-called, there are about six in the whole of Colombia. Of the remainder of the factories, a few work with steam, but not vacuums, and on a very small scale, producing quantities insignificant in the extreme as compared with the output in Cuba, Hawaii, etc. The greater part of the sugar consumed in the country is made by the primitive method of direct fire in small boilers, with large pots or circular or semicircular tanks (made of iron and perforated) and with clay molds.

The principal sugar factory of Colombia is the Sincerin, in the village of the same name, Department of Bolivar, near Cartagena. The total extent of the property is approximately 18,000 hectares (44,478 acres), including bush and uncultivated lands. The capital invested is $1,400,000. The amount of land under cane cultivation, with cane grown up full, is 1,600 to 2,000 hectares (3,954 to 4,942 acres). The average production is 40 tons of cane per hectare, or 16.19 tons per acre. The labor force is estimated at 200. The value of the plant is $1,500,000; it was set up by a Cuban engineer and is very modern. The capacity of the machinery in 24 hours is 800 tons of cane. The factory turns out from 70,000 to 100,000 hundredweight per annum. Its percentage of extraction of sugar on the basis of cane is said to be 9½ per cent.

In the same Department of Bolivar there was established a few years ago, after the foundation of the Sincerin, the factory called Central Bolivar. This is equipped with boilers, grinders, dryers, conductors, one centrifugal, necessary auxiliary apparatus, and a railway line to the port. The capacity of the plant is understood to be about one-quarter that of the Sincerin.

In the Department of Cauca, close to the town of Palmira, is the plantation La Manuelita, belonging to Mr. Eder, an American citizen. This enterprise dominates the Cauca. The land is very fertile and the machinery modern, though not so much so, perhaps, as that of the Sincerin, the plant being smaller. When the plant was first built it could not export. This situation is now altogether changed by the completion of the railway to Buenaventura, which permits of exportation through that port. It is estimated that the capacity of La Manuelita is about one-half that of Sincerin, with possibilities of expansion owing to the fertility of the soil and the facilites for exportation. The consumption of sugar in the Cauca is not sufficient to sustain a large factory in that region.

The factory of San Jose in the Department of Santander is smaller than the Central Bolivar. Its production is said to be rather small. It belongs to a Franco-Belgian company, which started at the same time in the same place various industries such as a flour mill, a chocolate factory, and wool and cotton weaving. The small quantity of sugar produced is consumed in the making of chocolates and therefore does not get into the market. In the same Department, which has always been the chief sugar-producing Department of Colombia, there are from 1,000 to 1,200 small mills, which altogether produce annually about 50,000 hundredweight of low-grade sugar, which finds its way to Bogota to be used principally in the manufacture of chocolate. This sugar is made by what is called the Jamaica method, direct fire with clay molds, and the sugar is filtered through clay, centrifugals not being used.

In the Department of Cundinamarca there are also some hundred small mills like those previously described and equally primitive. These mills are located in the municipalities of Guadnas, San Juan, and Chaguani. As this last-mentioned place is the principal center of the industry, this sugar is known in Bogota as Chaguani sugar. It is made in broken country, of very sweet canes, having about 10° to 13° Baumé. The annual production is scarcely 6,000 hundredweight and diminishes very materially when the price per arroba (12.5 kilos or 27.55 pounds) is less than $1.50. This last statement is true to a less degree in Santander; there, although the land is less fertile, the inhabitants are more steady and industrious and, inasmuch as they have nothing else to fall back upon, they do not abandon the sugar business until the price per arroba falls below $1.

In Cundinamarca there are four concerns producing sugar by means of steam machinery and centrifugals. The Tobia plantation in the municipality of Villeta produces about 4,000 arrobas (about 1,102 hundredweight) per annum. The Guasinal plantation in the municipality of Tena, a short distance from Horspicio station on the Girardot Railway, has an annual production of about 2,000 hundredweight. Its lands, worked for many years, have to be manured. They give poor but very sweet cane, of from 10° to 12° Baumé. The San Antonio plantation, in the municipality of Viota, produces annually about 2,500 hundredweight. The land is poor, the cane is short lived, and it has only about 7° Baumé. Only that on the hills reaches 9° to 10°. The water power is insufficient, as the small stream that furnishes the water has only a very slight fall. Adjacent to this property there are about 1,600 hectares (3,954 acres) of pasture, but the land devoted to sugar (including the factory) is only about 450 hectares (1,112 acres).

The Golconda plantation is said to be the best in Cundinamarca. The land is prodigiously fertile and produces robust cane of from 9° to 11° Baumé, according to the season. It has 640 hectares (1,581 acres), part in cane, part in cacao, and part in coffee (250,000 trees). The property has sufficient water power derived from the River Calandaime (which also passes through the San Antonio plantation), and the power can be augmented considerably up to 200 horsepower, as the volume of water in the driest month (September) is 400 liters, with a fall of 50 meters. The annual production of sugar is 4,500 hundredweight. To enlarge this business it would be necessary to purchase neighboring lands, as in the Golconda plantation all the land that is not under cane is used for coffee and cacao cultivation. The owners of this property completely control the market for industrial alcohol. They are said to be the only manufacturers of that article in Colombia.

In the Department of Tolima, municipality of Ibague, there is a plantation smaller even than those in Cundinamarca.

In the Department of Antioquia the production of raw sugar ("panela") in 1914 was 45,128 metric tons (of 2,204.6 pounds each). The production of crystallized white sugar in 1914 was 1,669.3 tons.

The number of mills in the Department of Antioquia for the elaboration of raw sugar in 1915 was as follows: Driven by water power, 769 mills or "trapiches"; driven by animal power, 2,002; driven by hand power, 3,891; other sources, 8; total number of mills, 6,670.

The price of raw sugar in Antioquia varies from 2 to 3 cents per pound of 500 grams (1.102 pounds). In some other localities it is as low as 1 cent per pound. It has been as low as ½ cent per pound. Prices change continually with the weather and crop conditions.

It is planned to erect at an early date in Medellin a refining sugar factory with a capacity of 4 tons per day. The latest type of machinery will be used. The sugar that is produced in Medellin is consumed in the locality. The price varies from 5 to 8 cents per pound when the sugar is bought in large quantities. The retail price is from 7 to 12 cents per pound.

The sugar produced at the Sincerin factory is not refined. It is centrifugated only. The analysis follows: Water, 0.12 per cent; ashes, 0.2 per cent; insoluble matter, 0.06 per cent; inverted sugar, 0.3 per cent; sucrose, 99.3 per cent; total, 99.98 per cent. It differs from foreign sugar in percentage of water. It is not passed through animal-charcoal filters.

An analysis of raw sugar ("panela") from the Antioquia district follows:

	Best quality.	Inferior.
	Per cent.	*Per cent.*
Water	6.20	5.2
Insoluble matter	0.15	0.3
Organic acids	0.36	0.5
Ashes	1.20	2.0
Inverted sugar	5.10	6.5
Sucrose	86.40	84.9
Total	99.41	99.4

This sugar is brown in color. It contains a considerable amount of water and impurities.

ARCHITECTURE AND CONSTRUCTION.

At the beginning of the conquest and colonization of Colombia architecture, as was only natural, did not exist. The structures that the colonists erected were of the most primitive kind and had no other object than to provide shelter from the elements and security from attack. Later on, when the people began to erect more elaborate edifices, such as churches and other permanent buildings, the Spanish style was adopted and has continued to the present time. Most of the churches now standing (more especially those in Bogota, to which city these present lines relate) date from the colony.

The principal churches were built under the direction of the architect Petres, a Capuchin friar from Spain, to whom are due, perhaps, the first examples of architecture, properly so called, in the country. These churches are in the classic style, constructed of stone and brick, and similar to many of the churches in Europe, especially in Spain. The same may be said of the convents, which consist of two or more spacious courtyards surrounded by cloisters formed of columns and arches, onto which open the rooms and halls. All these structures are covered with tiles of baked clay, Roman or Spanish style, this being the kind of roof most in use to-day.

After the achievement of independence and the establishment of the Republic came architects like Schelff and Reed, who exercised considerable influence in architectural taste and construction. To the latter the country is indebted for the plans of the National Capitol Building, a classic edifice, to the completion of which other architects are contributing and which, when finished, will be one of the finest structures in Colombia and will compare favorably with similar buildings in Europe and America.

At the present time architectural taste has improved considerably, owing to the fact that many of the architects of the country have lived and traveled in Europe and some of them have made a special study of modern construction on European models, more especially the French and Italian. At the same time the systems of building in vogue in Bogota have also improved, and what was previously done in a spirit of routine is now performed in a scientific manner.

Construction materials used in the time of the colony and the early days of the Republic were: For walls, adobe and stamped earth; for foundations, whole stone; for roofing, wooden poles and tiles of baked clay, Spanish style; for mortar clay and for external finish, river sand with a small portion of lime. At present the following materials are used: For walls, brick, slabs of hewn stone conveniently shaped, and concrete blocks; for foundations, rough hard stone and concrete blocks; for mortar, various mixtures of sand and lime, sand and hydraulic lime, sand and cement, and plaster of Paris. For roofing the old-fashioned clay tile, Spanish style, is still chiefly used; but French tiles and metallic roofing for mansard roofs are also in use. Every kind of wood is used in construction and forms an indispensable element in framing and floor construction and for trim.

As regards the quality of the native materials, it may be said that they are equal, if not superior, to those generally in use the world over, but unfortunately their power of resistance has never been studied in a proper manner. In addition to the materials already mentioned, all the others to be found in Europe also exist in Colombia, such as feldspar, asphalt, slate, etc., but these are not much used owing to the lack of transportation. An exception is asphalt, which is being used for street paving.

The subsoil of Bogota is generally good; although not formed of surface rock, it is composed of compact clays of great thickness and only in old river beds are alluvia to be found.

II. SPECIFIC BUILDING ACTIVITIES.

MISCELLANEOUS CONSTRUCTION WORK AND PROJECTS.

In Barranquilla during the past year there have been constructed one three-story reinforced concrete building, 49 by 105 feet by 62 feet high, containing approximately 322,000 cubic feet, and costing $44,000, an extension to the Fábrica de Tejidos Obregon amounting to approximately $300,000, and a number of less important improvements, all of which used certain amounts of foreign hardware, steel, and cement products.

One of the best firms of architects and builders in Barranquilla has recently been commissioned by the Government to make the working details and schedules of quantities of the necessary materials for the construction at an early date of the new customhouse at Barranquilla. This structure will be of modern reinforced concrete construction and will cost approximately $150,000. It is proposed to import the steel, cement, roofing, ornamental ironwork, and the better finishing materials for the work.

The business of the Fábrica de Tejidos Obregon is reported to be sufficiently prosperous to warrant the construction of further extensions to the amount of $1,000,000 to $1,500,000, including equipment. The owners would be willing to consider the engagement of the necessary capital to prosecute the extensions at an early date.

Mrs. John Meek (Kathleen Meek), proprietor of the Pensión Inglesa, Barranquilla, owns a block of ground in the city of Barranquilla on which it is proposed to construct a modern hotel building containing baths and all modern conveniences. The building would be of reinforced concrete (American materials being used) and would cost about $50,000. Tentative plans for the improvement accompany this report and may be examined by interested persons. Application should be made to the Bureau of Foreign and Domestic Commerce or its district offices (file No. 1311).

In Medellin the following buildings are in process of construction or are projected: University of Antioquia, estimated cost $100,000; College of the Jesuit Fathers, estimated cost $300,000; live-stock market, estimated cost $100,000; municipal palace, estimated cost $200,000; palace of the government of the Department, estimated cost, $500,000; San Vicente Hospital, estimated cost $500,000; reconstruction of the Municipal and Department Theater, estimated cost, $60,000; new floor in the cathedral, estimated cost $50,000; model schools, estimated at $35,000 each.

In addition to the building work the municipality is now constructing a new aqueduct at an estimated cost of $3,000,000. This work is described under the heading " Medellin aqueduct " (see p. 32).

At Honda, Samper & Co., of Bogota, contemplate the erection of a tannery. The company may be addressed at Bogota in relation to this enterprise.

The Compañía de Cemento Samper has a project for the construction of a warehouse for the storage of cement, products of the country such as potatoes and grain, and imported articles. It is proposed to locate this building near the new railroad yard and station, Bogota, and occupying a site 100 by 120 meters (328 by 394 feet). Architects and engineers familiar with warehouse construction may find advantage in addressing the company, which is interested in obtaining the best plan for the proposed work. This company is also interested in constructing at an early date a modern rotary-kiln cement plant to be located a short distance from Bogota near the rock quarries. In connection with the operation of the company's present cement plant in the city of Bogota, it is interested in the matter of aerial cables for facilitating the delivery of the raw materials to the railroad El Norte from the quarries.

Sres. Tomás Samper and Joaquín Samper, of Bogota, are interested in a project for the construction of a new theater for the city of Bogota, to cost from $80,000 to $100,000. The proposed location is on Carrera 7 between Seventeenth and Eighteenth Streets. An American architect has already submitted plans, and it is expected that the construction will proceed at an early date.

The Tranvía Municipal de Bogota contemplates the prolongation of its line to the north of the city 2 kilometers (1¼ miles) and to the east 600 meters (⅜ of a mile); also the placing of rails in the city in all of Carrera 4a and the establishment of three or four lines from east to west to cross the two north-and-south lines that now exist and enter the line proposed for Carrera 4a.

Other work proposed for early execution by the city government includes a new market, extensions and improvements to the present aqueduct, and a new slaughterhouse.

The National Capitol Building and the Colombian Academy of Languages are nearing completion. The following work in charge of the department of public works is now under construction: Building for the Faculty of Natural Sciences and Medicines, Pasaje Rufino Cuervo; building for the Central School of Arts and Crafts, Paseo Bolivar, Boyaca Avenue, and Avenue of the Republic.

Sres. Antonio Samper Uribe and Miguel S. Uribe Holguin, P. O. Box No. 9, Bogota, have recently obtained a 50-year concession for the construction and exploitation of an aerial cable between the falls of Taquendama and Tocaima, with a branch to the Alto de La Cruz—the line (including the branch as proposed) to have a length of 51 kilometers (31.69 miles).

The projected Eastern Tramway, 15 kilometers (9.42 miles) long, has a twofold object. It traverses 3 kilometers (1.86 miles) of the city and connects Bogota with the municipality of Usine, a region producing much wheat, potatoes, and other products of the cold country. The region is also rich in coal, iron, lime, clay, sand, and other building materials.

For the railway from Tunja to Chiquinquira, 89 kilometers (55.3 miles), and the railway from Sutamarchan to Santander, the frontier section of the Carare Railway, 40 kilometers (24.85 miles), making a total length of 129 kilometers (80.15 miles), a concession was granted to Dr. José C. Medina in 1916 by the Department of Boyaca—in the case of the first section for privilege to construct and in the case of the second for construction. The line would traverse extensive territory with a cold climate well adapted for sheep and cattle raising and agriculture. The line would also make connection with the extension of the Northern Railway and be brought into communication with a territory having a population of 1,500,000.

The project for the Ferrocarril del Carare, an undertaking started in 1872 and destined to connect Bogota with the lower Magdalena River, was reconsidered in 1916. By this line Bogota would be placed within three days of the Atlantic coast and within two or two and one-half days of Medellin.. For information on this project and the two last-mentioned projects, interested persons should address Vicente Olarte Camacho, Bogota, Colombia.

In 1908 the city of Bogota received specifications and estimates from an international engineering corporation of London, England, for a comprehensive system of sewers and municipal sanitation, as well as for the construction of various buildings, utilities, and paving, as follows: Sewers and sanitary work, estimated cost $5,034,000; central market, estimated cost $412,600; market of the third class, estimated cost $88,300; live-stock market, estimated cost $127,100; public slaughterhouse, estimated cost $210,500; 3,000 workmen's houses, estimated cost $1,915,000; modern hospital, estimated cost $620,000; offices and houses on the site of the Hospital San Juan de Dios, estimated cost $1,380,000; schools, estimated cost $492,000; street paving, estimated cost $1,750,000; public lavatories, estimated cost $97,000; repairs to bridges, estimated cost $23,000; canalization of the two rivers flowing through the city, estimated cost $471,800; ornamentation of the city and the parks, estimated cost $300,000; acquisition of the Oriental Zone, estimated cost $139,000; making a total estimated cost of $13,060,320.

All of the work planned has not been carried out. The city has undertaken the canalization of the rivers; this work is now being prosecuted in a continuous manner with a conservative organization, and it is expected that it will be completed at an early date.

Diego Martinez & Co., of Cartagena, have a concession from the Government of Colombia for the establishment of a packing house on the Atlantic coast. They have endeavored to attract American capitalists, but they are understood to have encountered the difficulty that in the Department of Bolivar there are not enough cattle to keep a packing house in operation and the cattle in the interior can not be shipped because of the lack of roads.

Colombia has enormous uncultivated lands adapted to the raising of cattle. It is reported by Cunningham Graham, to whom a concession has recently been granted for the establishment of a packing house, that there are at present in the lower provinces about 1,500,000 head of cattle, from which it is believed that 80,000 or 90,000 head could be drawn each year. Mr. Graham reports that the greatest length of time involved in bringing the existing cattle to the possible location of a packing house would be eight days.

MEDELLIN AQUEDUCT.

The water supply for the city of Medellin is taken from two springs, whose waters flow through two ravines—Piedras-Blancas, with a discharge of 80,000 cubic meters (21,136,000 gallons), and Santa Elena, with a discharge of 10,000 cubic meters (2,642,000 gallons) in 24 hours. From other sources, controlled by private companies, another 3,000 cubic meters (792,600 gallons) is obtained. The quantity of water actually reaching the city is 20,000 cubic meters (5,284,000 gallons), as follows: Piedras-Blancas, 7,000; Santa Elena, 10,000; private aqueducts, 3,000. However, with the present system of aqueducts, without pressure and of continuous flow, only an insignificant part of this water is actually utilized.

The municipality wishes to make an aqueduct using the water of Piedras-Blancas, which is more than sufficient for the city's needs. The project consists of a concrete aqueduct 7 kilometers (4.35 miles) long, with a 2 per cent grade, 4½ kilometers (2.8 miles) of this line being now in service; a steel pipe line 2 kilometers (1.24 miles) long, with a fall of 550 meters (1,804 feet) for power; a filtration plant with a capacity of 30,000 cubic meters (7,926,000 gallons) in 24 hours; and a line 2 kilometers long, with a grade of 2 in 1,000, to carry the water to the distributing tanks. The distribution in the city will be made by means of cast-iron pipe.

The machinery, tools, and materials used up to the present time on the above work have been imported from the United States—engineering instruments from C. L. Berger & Co., drawing materials from Keuffel & Esser, construction machinery and piping from the Lock Joint Pipe Co. (consisting of 38 molds and two mixers, with 2½-horsepower gasoline motors). The cement used thus far has been of American manufacture, Alpha and Dexter brands, and has cost in the city $40 per ton legal gold ($37.73, or $6.79 per barrel of 180 kilos, United States currency). The reinforcement of the concrete pipes is made with triangular mesh steel from the United States Steel Co. The coarse aggregate for the concrete is quartz of great purity, hard serpentine, and hard gneiss broken by hammer to 1-inch size. The cubic meter of broken stone costs about $3 legal gold ($2.18 United States currency per cubic yard). The sand is composed of quartz grains ground in a small California mill turning out 5 to 8 cubic meters (6.54 to 10.46 cubic yards) in 24 hours. The cost of 1 cubic meter of sand is $4 ($2.90 per cubic yard).

The wages of common laborers are $0.70 legal gold ($0.66 United States currency) per day of 10 hours, and of the skilled workmen $1.50 legal gold ($1.41 United States currency).

The concrete pipes used on the work are 27 inches in diameter and 4 feet long, with walls 3½ inches thick reinforced with triangular mesh.

The value of 1 kilometer of the reinforced concrete pipe (laid) is as follows: Removing soil, $1,243.18 Colombian legal gold; leveling, $76.80; slides, $583; labor of laying pipe, $878.62; concrete pipe, 820, $5,375.19; mortar joints, 820, $615.66; manholes, $41.65; fill, $247.40; total, $9,061.50 per kilometer, or $13,758 per mile, with exchange at $1.06. This is the actual construction cost. No expenses for administration, tools, right of way, or buildings are included.

The right of way to complete the work is being purchased gradually, the authorities obtaining the property along the Piedras-Blancas ravine, thus insuring the purity of the water and avoiding large cuts in laying the line.

SANITATION, DRAINAGE, AND PAVING OF BOGOTA.

The drainage from the houses in Bogota converges to the sewers that run the length of the streets. The sewers are circular, semicircular, and oval. The circular sections have diameters of from 30 to 50 centimeters (11.81 to 19.69 inches), and the oval ones are 70 by 100 centimeters (27.56 by 39.37 inches). The latter are constructed of brick laid in lime mortar with a covering of cement, and the pipes are of cement and glazed baked clay. The latter materials are also used for the private drains. The cost varies from $3 to $10 legal gold per linear meter (from $0.86 to $2.87 United States currency per linear foot).

The sewers discharge into the River San Francisco and San Agustin or into the meadows to the west of the city. The San Francisco River, which, when in flow, has a volume of 18 cubic meters (636 cubic feet) per second, is reduced in summer to a little creek of 112 liters (about 4 cubic feet) per second. The San Agustin also varies from 10 cubic meters (353 cubic feet) to 50 liters (1¾ cubic feet) per second.

On account of the small volume of water in these rivers they deposit in their beds a large quantity of fecal matter, which infects the air and gives a repugnant aspect to the surroundings. The canalization of these rivers will tend to remedy these evils, beautify the city, and facilitate traffic. The San Francisco has just been canalized for a distance of 100 meters (328 feet) and the San Agustin for 800 meters (2,625 feet). The San Francisco section is oval and measures 3.15 meters by 2 meters (10 feet 4 inches by 6 feet ¾ inch) with a 1$\frac{3}{10}$ per cent grade. The San Agustin is 2.25 meters by 1.50 meters (7 feet 4½ inches by 4 feet 11 inches) with a grade varying from 1½ to 3 per cent. The base of each sewer is hard hewn stone, and the walls and arch are of brick with cement facing. The cost of the first sewer was $300 legal gold ($283 United States currency) per meter, equivalent to $86.28 per linear foot. The cost of the San Agustin sewer was $100 legal gold ($94.33 United States currency) per meter, equivalent to $28.76 per linear foot. The latter sewer was simply leveled off, while the former was converted into an avenue 12 meters (39 feet 4 inches) wide.

The above work was designed and executed by Colombian engineers, Pedro Uribe and Ramon J. Cardona.

There remain to be canalized more than 2,000 meters (1.22 miles) of the San Francisco River and 300 meters (0.186 mile) of the San Agustin River. It is assumed that this work, when finished, will prove to have been eminently worth while from a purely business standpoint, inasmuch as the cost of the work and of purchasing the right of way will be amply compensated by the increase in the value of the surrounding properties. The surplus waters from the sewers and rivers are utilized in an informal manner for irrigation and fertilization of low-lying fields. Their methodical and scientific utilization would be a good business.

In addition to the rivers mentioned, the city is drained by the ravines Valencia, Tres Esquinas, La Vieja, and Arzobispo, all of which will be canalized in time.

SPECIFICATIONS FOR MACADAM PAVEMENT.

Following are the specifications for macadam pavement in Bogota:

1. Where necessary, road must first be drained perfectly so that the level of permanent saturation will not be less than 1 meter below the center of the surface of the finished road.

2. In arranging the surface for the different layers of material the hard surface that may exist must be disturbed as little as possible. Holes must be filled with hard material, instead of excavating the high spots to the level of the bottoms of the holes.

3. The leveled surface of the foundation must then be covered with a thin layer of pieces of such hard material as may be easily obtainable, such as broken brick, slag, or stone, and this must be perfectly worked in by means of a steam roller with a minimum weight of 5 tons and giving a pressure of at least 1 ton per foot (0.305 meter) of width. Material must be deposited in thin layers and rolled until it is perfectly consolidated, and no more stones can be rolled into it, and a hard and firm surface is obtained. This surface must have a curvature equal to that of the finished surface to be described later.

4. The method of making the road must depend on the best materials that can be economically obtained, and on the experiments made with these materials with regard to traffic. However, until such data are obtained the method in general must be as follows:

5. The total minimum thickness of road material over the surface of the foundation must be 23 centimeters (9 inches) for first-class streets where there is a heavy traffic and 15 centimeters (6 inches) for second-class streets with less traffic.

6. Over the prepared surface, as per paragraph 3, there must be placed stones of such size that the largest will pass through a ring of 10 centimeters (4 inches) diameter and the smallest through one of 7½ centimeters (3 inches). The steam roller must pass over the larger, and as the stones begin to consolidate there must be deposited stones that can pass through a ring of 5 centimeters (2 inches) and material of "union" of small fragments to fill up interstices. This layer must then be rolled and augmented till it is consolidated with a surface of 7½ centimeters (3 inches) below the level of the final surface of a road of 15 centimeters (6 inches) thickness, and of 12½ centimeters (5 inches) below the finished surface of a road of 23 centimeters (9 inches) thickness.

7. Over the first layer of stone thus formed there must be deposited (a) on the roads of 15 centimeters (6 inches) thickness one layer and (b) on the roads of 23 centimeters (9 inches) thickness two layers of stone. The largest stone of these layers must pass through a ring of 5 centimeters (2 inches) diameter or weigh approximately 170 grams (⅜ of a pound) and have a cubical form as far as possible. The small stones that result from breaking the stone must not be placed with the large stones in the first layer. Sufficient stone must be deposited to give each layer the thickness and section necessary after the completion of the rolling and when the stone is perfectly consolidated.

8. Such a steam roller as specified in paragraph 3 will work from one side to the other over the layer of stone. When this is partly consolidated the small stones and fragments obtained by breaking the stones and other binder material must be deposited or scattered sufficiently in front of the roller. All the holes left by the roller must be filled with a sufficient quantity of stones that will pass through a 5-centimeter (2-inch) ring and binder material to fill up the holes to the general level. This procedure of adding stone and binder material must be continued, with smoothing and rolling, until the correct section and surface is obtained and the stones are consolidated to such a

degree that the material of the road does not move under the roller when it advances.

9. The cross-section of the surface of the road must be approved by the governor. The elevation of the center of the road must exceed the level of the sides by a sixtieth part of the width of the road.

10. The border and the sidewalks must be in accordance with the city regulations.

In Bogota the street department makes repairs to the city streets from time to time, but the comprehensive reconstruction of these will probably be deferred until the sewer system has been amplified. This statement is applicable also to Medellin and Barranquilla. The latter city is very much in need of an entire new sewer system and modern pavements.

III. PARTICULAR MATERIALS AND EQUIPMENT.

GENERAL CONSTRUCTION MATERIALS.

STEEL PRODUCTS.

Aside from the steel bridges, rails, railway supplies, and barbed wire that are being imported into Colombia from time to time a certain amount of both steel and wrought iron is imported, not only for wheel and millwright work, but also for the purpose of manufacturing in the country light ironwork, such as window guards, railings, and other special work for buildings. Corrugated and plain galvanized steel and iron sheets are also imported in considerable quantities, being used principally for rural and industrial buildings.

Reinforced concrete construction is almost unknown in the country; the only examples of any note are in the cities of Barranquilla and Cartagena, and these are few in number and do not present any special features. For the most part this type of construction is at present in the hands of masons and house builders who have a rather inadequate knowledge of the work. They have used in the past telegraph wire, barbed wire, and wrought-iron bars of poor quality, and for these reasons several failures of slabs and beams have taken place. The Government and general public now realize that the modern type of reinforced concrete construction is required, and the plans of the proposed new customhouse to be erected shortly in Barranquilla provide for a building of this class.

When steel products return to a normal price basis the designers of reinforced concrete on the coast (of whom there are a small number) predict that this class of construction will be employed to an increasing degree. The prices of steel products in Bogota are generally so high that the use of modern reinforced concrete is rare, and its more extensive use depends wholly on the possibility of landing the materials in the capital at reasonable prices or on the manufacture locally of the necessary metal products. Of late a considerable amount of metal paneling and ceiling has been imported and the demand for these products will increase gradually as transportation facilities improve. These materials are imported mostly from the United States.

The tonnage and declared values of the steel products imported during 1915 are shown below. The "selected products" are as follows: Steel in ingots, sheets, and rods, unmanufactured; wire for making nails; wire of various diameters; barbed wire; bars, round, octagonal, and square; steel cables; tubes and trestles of iron or steel; nails, tacks, rivets, and screws; telegraph and telephone poles of steel; iron in ingots, unmanufactured; galvanized iron and steel, plain and corrugated; iron and steel, forged, in ingots, sheets, or hoops, rounds, squares, plain bars, half-rounds, and Ts; tin in bars or sheets; tires for wheels; materials for construction, fountains, gratings, etc.;

bridges for private constructions; wire cloth; piping and accessories; and iron rods. The items of "steel rails and metal crossties for railroads" and "accessories for railroads" are reported separately, the former not paying duty and the latter being miscellaneous in character and including many items in both iron and steel, manufactured, ready for use.

Imports of "selected products" were: Dutch West Indies, 63 tons, valued at $2,577; France, 5.53 tons, valued at $941; Isthmus of Panama, 28 tons, valued at $2,580; Italy, 10 tons, valued at $92; Netherlands, 116 tons, valued at $7,700; Spain, 3.44 tons, valued at $910; United Kingdom, 535 tons, valued at $54,072; United States, 9,971 tons, valued at $553,771; total, 10,732 tons, valued at $622,643, giving an average price of $58 per ton. The United States sold 93 per cent of the tonnage, at an average price of $55.54 per ton. The United Kingdom sold 5 per cent of the tonnage, at an average price of $101; this price may be accounted for in part by the fact that bridge work made in Aberdeen, Scotland, finds its way into the interior of Colombia.

Steel rails and metal crossties for railroads were imported into Colombia in 1915 as follows: Netherlands, 6.22 tons, valued at $269; United Kingdom, 26.66 tons, valued at $1,564; United States, 4,419.4 tons, valued at $138,580; total, 4,452 tons, valued at $140,413, giving an average price of $31.54 per ton. The average price of the material sold by the United States was $31.36 per ton, and of that sold by the United Kingdom $58.67 per ton.

Only such rails as are indispensable are being imported by the railroads at present, owing to the increased price and delayed deliveries. An importation of 400 tons delivered at Medellin at the end of 1916 cost $90 gold per metric ton, equivalent to $77 per ton of 2,000 pounds, with exchange at $1.06.

The accessories for railroads imported into Colombia in 1915 follow: United Kingdom, 187 tons, valued at $25,903; United States, 163 tons, valued at $11,564; other places, 5 tons, valued at $3,144; total, 355 tons, valued at $40,611.

The imports of metal products in general into Colombia fell off from 18,127 metric tons, valued at $2,670,472, in 1914 to 12,768 tons, valued at $1,435,405, in 1915, because of reduced shipments from Europe. From the 1914 figures it will be observed that there is a good demand for steel products in Colombia.

PORTLAND CEMENT.

Portland cement is used by the Government and privately owned railroads and for road, dock, and other constructions where it is vital to secure and maintain good masonry. Where the cost is not prohibitive architects and builders are beginning to employ Portland cement for the mortar used in facing brick and stone walls, for ornamental work, and for floors in general building work.

There are two cement mills in Colombia—one at Bogota with an old type of vertical kilns and the other near Medellin with similar kilns. Both mills have modern grinding machinery.

The quality of cement made at the Bogota mill, which has a normal annual production of 1,800 tons (10,000 barrels), is not of a uniform grade, and the material manufactured thus far has been used, for the most part, in work other than reinforced concrete. Where the loading is quiescent, such as in walls and in floors on ground and for the plain facing of walls and other plastering (no frost being present in Bogota), the material serves a useful purpose. The selling price of the locally made cement in Bogota is from $50 to $56, legal gold, per ton of 1,000 kilos; with exchange at $1.06, the price of the barrel containing 180 kilos (397 pounds) is equivalent to $8.49 to $9.50 United States currency. The cement made in Bogota finds a market as far down as Girardot, where the imported material is now selling at $60 legal gold per ton, or $10.19 United States currency per barrel of 180 kilos (397 pounds gross).

The mill near Medellin turns out a good quality of cement, but the output is small and insufficient to meet the demands for this class of material in Antioquia. The mill, it is reported, has been located at a point where there are not sufficient lime materials to enable the manufacturing to be continued, and it is said that it will be only a question of a short time until the mill must be shut down owing to lack of raw materials. The present selling price in Medellin of the material made near the city is $60 legal gold per ton, or $10.19 United States currency per barrel of 180 kilos (397 pounds gross). Imported cement being brought into Antioquia by privately owned railways is costing at present $9.85 United States currency per barrel of 180 kilos.

It is reported by one of the railway companies that before the war their cement was imported principally from Europe. No detailed figures are available of these quantities.

The following statistics give the total imports for 1915: Dutch West Indies, 344 barrels, valued at $561; France, 13 barrels, valued at $68; Isthmus of Panama, 1,002 barrels, valued at $2,289; Italy, 158 barrels, valued at $111; Spain, 23 barrels, valued at $203; United Kingdom, 3,635 barrels, valued at $7,707; United States, 39,966 barrels, valued at $56,308; other places, 947 barrels, valued at $1,923; total, 46,088 barrels, valued at $69,170. The average declared price was $1.50 United States currency per barrel of 180 kilos. Of the total imports the United States sold $86\frac{7}{10}$ per cent, at an average price of $1.41 per barrel. The average price of the material from the United Kingdom was $2.12, from the Dutch West Indies $1.63, from Spain $8.82, from France $5.23, from Italy $0.70, from the Isthmus of Panama $2.28, and from all other places $2.03 per barrel of 180 kilos. The material from France and Spain was evidently white or other special cement, and that from Italy material of an inferior grade.

Most of the architects, engineers, and constructors who were interviewed deplored the fact that they should be without a good cement mill of their own. It is reported that the raw materials necessary for making cement may be found in at least six different locations in Colombia. The most favorable of these locations are near the city of Bogota and in the territory between Bogota and the Magdalena River. At both these locations, or near them, may be found coal for burning cement and hydroelectric power for the operation of the mills. Of these properties the one nearest Bogota, owned by the Compañía de Cemento Samper, of Bogota, which is now making cement by the use of vertical kilns, is one where conditions are favorable for development at an early date. This company has already requested tentative estimates and information from the United States for a machinery installation sufficient to undertake, at the start, the manufacture of approximately 150,000 barrels of cement per annum. Interested persons who have not been requested to furnish information may address Compañía de Cemento Samper, 41 Carrera 17, Bogota, Colombia.

Another likely location for the installation of a Portland cement plant is near Anolaima, on the Girardot Railway, 69 kilometers (42.87 miles) from Bogota, and at the adjacent town of Cachipay, 79 kilometers (49.08 miles) from Bogota. The limestone at Anolaima is a hard rock to grind, with the exception of one deposit, which is reported to be oolitic limestone and which is not so hard. One sample of the Anolaima material was analyzed by Prof. Edward Orton, of the department of ceramics, Ohio State University, and was reported as satisfactory for cement manufacture, but harder than that generally used for the purpose. Information regarding these properties may be obtained from G. A. Ritchie, Anolaima, Colombia.

In Antioquia there are other deposits of limestone and cement rock that would bear investigation by interested persons. The transportation conditions in the case of one of the properties near the Cauca River are not good at present, although the materials are reported to be among the best in all Colombia. Information regarding these deposits of cement rock may be obtained from Gustavo Bachmann, civil engineer, Medellin, Colombia. Further information may be obtained from Jaramillo Villa y Cia., Medellin, Colombia, having property in the Puerto Berrio district.

There would appear to be a larger market in the Bogota section and the river towns below; also for the development of the country in the direction of Bucaramanga, toward which some Government roads are now in process of construction and others are projected.

For details of entry charges and river and rail freights on cement entering Colombia the reader is referred to the schedules given elsewhere in this report (see p. 67).

The price of Portland cement on the coast ranges from $4.50 to $5 legal gold ($4.25 to $4.75 United States currency) per barrel.

CRUSHED STONE.

Rock for ballast and concrete is abundant all over Colombia. The railroads of Antioquia use a granite that is mostly broken by hand by native labor at an extremely low cost. In Bogota the material is a sandstone taken from the western slope of the eastern Cordillera. There are four important quarries supplying Bogota with broken stone in sizes ranging from $\frac{3}{8}$ inch to 1 and 2 inches. The material costs in Bogota $1.50 to $3 per cubic meter or $1.09 to $2.18 per cubic yard, according to the size. The public works pay $1.30 per cubic yard for the material used in their work in Bogota. In Barranquilla rock is of lime base and the material is, for the most part, broken by hand.

STONE AND BRICK MASONRY.

Stone masonry is used wherever building stone is found, notably in Bogota and the surrounding Sabanas and the slopes of the Cordillera Oriental (eastern Andes). In the volcanic area of the central

Cordillera from the Department of Tolima southward the class of stone found is of very little use for masonry, owing to its very refractory nature; it is serviceable for concrete, but is seldom used for this purpose on account of the exceptionally high cost of cement in those regions. The stone used in the city of Bogota is of sand base with a beautiful fine grain, is easily worked, and presents a fine appearance. On the Girardot Railroad all the abutments of the large bridges and culverts are made of stone masonry. Stone of a harder quality, a sort of granite, is also found and used on a small scale in Medellin.

In Bogota the cost of rubble stone masonry laid with lime mortar is $8 gold per cubic meter ($6.10 per cubic yard). Walls faced with cut stone, with brick backing, 50 centimeters (19.7 inches) in thickness, laid in lime mortar, cost $7 per square meter ($0.65 per square foot) or $11.72 per cubic yard. Special cut-stone masonry, such as columns, pilasters, and arch work, is more costly.

Brickwork is used to a greater extent than stone for walls of buildings. The brick in general use in Barranquilla is 12.5 centimeters wide by 25 centimeters long by 5 centimeters thick (4.92 by 9.84 by 1.97 inches). A smaller brick, 10 by 20 by 5 centimeters (3.94 by 7.87 by 1.97 inches), is also made. The thickness of the walls varies from one-half brick (called "citra") for interior partitions up to two and one-half bricks, depending on the height of the building.

The bricks made in the Barranquilla district are generally laid in lime mortar with very thick joints and irregular bond. The cost of the bricks varies from $6 gold ($5.66 United States currency) per thousand in the dry season to $12 gold ($11.32 United States currency) per thousand in the rainy season. Owing to their irregular form, they are very seldom left exposed, being plastered on both sides with lime or cement mortar. Face bricks are also made but are high in cost and not much used.

In Barranquilla a large factory for making sand-lime bricks was erected a few years ago, but owing to the poor quality of the material turned out the enterprise proved a failure. Only a very small quantity of this kind of material is made to-day.

In Bogota the ordinary brick clay is very abundant and of good quality. This material exists within the city limits and in the adjacent urban districts. Brick was not used very much for building in former years. In the time of the colonization of the city by the Spanish only the churches and the public buildings were partly constructed with brick. Adobe, or sun-baked brick, has been the principal material used for building houses. In the last 20 years the use of brick has been increasing, and to-day this material is used for constructing most of the buildings in the main part of the city.

Most of the building bricks are made by hand in hundreds of small yards by the most primitive means. The quality is poor, and the size and shape are very irregular. The kilns are generally unsatisfactory, burning as much as 800 to 1,000 pounds of coal to a thousand brick measuring 2½ by 4¾ by 10 inches.

There are only two brickyards in Bogota that have machinery. Both these yards make a very fair quality of brick, using American machinery. Some years ago a yard was established that used a Hoffman or Ring kiln, but the enterprise failed, it was said, because the clay was not suitable. Manufacturers familiar with the real conditions report that unsuitable machinery was employed to grind the clay, which is a sort of shale, rather hard but of good quality.

At one of the two better yards in Bogota ornamental repressed front bricks are made. There are a number of buildings in that city faced with the locally made front brick.

The prices of brick fluctuate a good deal, depending on the demand; in general, they are as follows: Ordinary brick made by hand, $8 to $10 per thousand; ordinary brick made by machinery, $12 to $15 per thousand; repressed front brick, $25 to $35 per thousand. In Bogota 1 cubic meter (1.308 cubic yards) costs $10 gold ($9.43 United States currency), equivalent to $7.21 per cubic yard. This cost is made up as follows: 500 bricks, $3.61; lime and sand, $1.44; labor, $2.16. The unit of work for a brick mason is 500 bricks per day.

In Medellin an unusually large-sized brick is used, measuring 10 by 20 by 40 centimeters (3.94 by 7.87 by 15.75 inches). These bricks are hard burned and of fair quality. Users of the material say that the size was adopted to reduce the labor of laying and increase the amount built in a given time. The material is somewhat unwieldy and the supposed economy in work performed is not generally conceded. There is an opening at present for improvement in brick manufacture in Medellin, and makers of brick machinery should investigate the matter. The price of these bricks varies from $50 to $60 gold ($47.17 to $56.60 United States currency) per thousand, according to the quality. The price of a cubic meter of brick masonry is $8 gold, or $5.77 United States currency, per cubic yard.

The material most used in Medellin for walls is "tapia" (tamped earth), that costs from $1 to $1.20 gold ($0.94 to $1.13 United States currency) per cubic meter ($0.72 to $0.87 per cubic yard). As this construction is cheap and there are no frosts to attack the integrity of the work, the earth walls will continue to be used, owing to the economy of the construction. There is a tendency among owners, however, to change the old earth-wall fronts of their houses for the more modern brick facework or rough brick walls finished with stucco.

Stone is not used for wall work in Medellin. About 35 kilometers (21.75 miles) from the city there is a good sandstone that may be used when the Ferrocarril de Amaga shall be extended to the quarries. For foundations dry stones are used. An effort is made to lay the dry-stone foundations with the minimum of interstices. These sections of walls usually do not have greater width than the imposed walls, especially when tamped-earth walls are used.

In the Barranquilla section from 200,000 to 300,000 bricks are made per month and in Bogota approximately 2,000,000 per month, while in Medellin 100,000 of the larger-size bricks are made.

ARTIFICIAL ORNAMENTAL STONE.

In Barranquilla and Medellin the architects and builders use a small amount of cast stone for cornices, balustrades, and small projections on the fronts of buildings. This material is, as a general rule, cast in place at the building by each contractor, there being no yards of importance where this kind of material is made either for stock or to order for sale to the contractors. Imported cement is used for such work, and the molds are built up on the work.

In Bogota the local cement company and one architect and contractor have recently begun the manufacture of urns, cups, hollow blocks, and balusters and railings of cast stone. The industry is very small, however. The material is used principally by the manufacturers for their own building operations. Locally made cement is used entirely for making this material in Bogota. The molds, which for the most part are of wood, are made in the carpenter shops of the companies that make the blocks.

No definite estimate can be made of the value of this work for a stated period, on account of the fluctuation in the demand. This depends on the amount of construction of better-class buildings, especially residence buildings. Most of the latter are of simple design and have the minimum of decorative effect.

ARCHITECTURAL TERRA COTTA.

No examples of architectural terra cotta were found in the buildings of Colombia. For cornices and other ornamentation of front work, projecting brick courses plastered with lime or cement mortar, cement mortar or concrete work molded in place, or a mixture of clay and manure, constitute the principal materials employed. Rarely has plaster of Paris been used, although raw material for making plaster is abundant throughout the country.

The present manner of ornamenting buildings would appear to be all that is necessary. The demand for ornamental material of this class is small, and it is extremely doubtful whether it would be profitable to establish kilns for burning terra cotta for front work. As regards importation of the material, it is clear that the small demand and the higher cost of United States products delivered (especially in the interior cities) would tend to make its exploitation impracticable at this time. As transportation is improved and larger and higher buildings are erected in the cities, there should be a market for architectural terra cotta in the better class of structures.

FIRE BRICKS.

Refractories are made in Bogota and at Caldas, Antioquia. Before the war the railroads near the former city imported the fire bricks for their locomotives, but of late this material is all being supplied by the local makers. The homemade material is also used in cupolas for melting iron, at the local cement-making plants, at sugar plants, and in bakers' and domestic ovens. The plant at Caldas ships its product to the coast for use in steamers.

There are three principal plants in Colombia where fire bricks are manufactured—two in Bogota and one at Caldas, near Medellin. In addition, there are several small yards in Bogota without machinery or any knowledge of the chemical or physical properties of the clays used. There are several grades of fire clay near Bogota, from the common refractory clay found under the brick clay to the more re-

fractory varieties found 10 miles from the city. Thus far no scientific study has been made of these materials; therefore there are no analyses to govern the manufacture.

One of the plants in Bogota uses machinery to grind and mix the raw materials, and modern kilns to burn the product.

Very little of this material is now imported for the interior. Altogether the demand in Bogota is small, not amounting to more than approximately 25,000 pieces per annum.

At Caldas any shape or dimension is made, according to demand. The usual sizes are two in number—6 by 13 by 26 centimeters (2.36 by 5.12 by 10.24 inches), weighing 3¼ kilos (7.16 pounds) and costing $0.06 legal gold per piece ($56.67 United States currency per thousand); and 10 by 14 by 29 centimeters (3.94 by 5.50 by 11.42 inches), weighing 6½ kilos (14.37 pounds) and costing $0.12 legal gold per piece ($113.34 United States currency per thousand).

The plant at Caldas has an annual output of 30,000 pieces, with the possibility of increasing this to 100,000 pieces should the demand increase.

No statistics were available on this class of material other than the above practical figures, which were obtained from the manufacturers of the local product.

MORTAR FOR PLASTERING AND MASONRY WORK.

Lime of excellent quality is made in the country. The mortar mixture for brick and stone work is usually one part of lime to three parts of sand. The lime used in Bogota is brought from the lower altitudes, usually from about 6,000 feet above the sea. The limestone used by the local cement mill in Bogota comes from "La Calera." It is carried by mules to an elevation of 10,000 feet and then down to the plateau. Much of the common lime used in Bogota is burned at Anolaima and brought to the city ready for use. There are five lime-burning plants at Anolaima and two at Cachipay, both accessible to Bogota.

The railroads in Colombia use cement for masonry, while lime, both live and hydrated, is used almost entirely for the best building construction. While limestone is somewhat difficult to obtain, especially in the inland country, the cost of the lime products is not excessive, considering the necessity at times of mule transportation to deliver the materials to the cities.

The present sources of supply are adequate for the demand in the several sections of the country, and the importation of low-grade material of this class is unnecessary.

PLASTER OF PARIS.

Plaster of Paris is used only in small quantities and, for the most part, is imported from the United States.

The material used in Bogota is calcined locally. This sells at $0.70 to $0.80 gold ($0.66 to $0.75 United States currency) for 12½ kilos (27.55 pounds), or $5.98 to $6.80 per barrel of 250 pounds. The cost per barrel on the coast for the imported material is at present $6.

Gypsum is abundant throughout the country. Should the demand in the interior increase it could readily be supplied by the present kilns or extensions thereto. The present means of transportation from the seaport cities to the interior make the cost of imported material prohibitive, especially to Medellin, Bogota, and the upper Magdalena River towns.

In 1915 only 99 barrels of plaster of Paris were imported into Colombia, of which Italy furnished 7 barrels and the United States 92 barrels.

SAND.

Sand is abundant and of excellent quality, especially in Barranquilla. On some of the higher slopes of the Andes the material is very poor and at places unobtainable. In Bogota a good silica sand is found on the western slope of the eastern cordillera near the city. This sand is of two grades. The best quality costs on the work in the city, in small quantities, $3.50 legal gold per cubic meter ($2.55 United States currency per cubic yard). This same quality of sand may be purchased in larger quantities at $2.50 legal gold per cubic meter ($1.81 United States currency per cubic yard). For public work the Government pays $2 per cubic meter ($1.44 United States currency per cubic yard). The second quality costs $1.60 legal gold per cubic meter ($1.17 United States currency per cubic yard). Both qualities of sand in Bogota are washed and delivered on the work in carts of half-meter (0.65 cubic yard) capacity.

In Medellin the building sand is very fine grained and scarcely regular in quality. In the work of the aqueduct a quartz sand is being used that is obtained by means of crushers. The cost of this sand per cubic yard is $2.90 United States currency.

FLOORING AND ROOFING MATERIALS.

HYDRAULIC FLOOR TILES.

Cement floor tiles are used to a large extent in the coast cities. The Spanish "mosaico" is in favor, especially in Barranquilla. The quality of the tiles made in Spain is said to be superior, on account of the better quality of raw materials used in the manufacture and the greater length of time given to the curing or aging of the product. Although large quantities have in former times been imported from Spain, these tiles are manufactured in all the principal cities of Colombia. In Barranquilla, where an approximate estimate was obtainable, it is reported that some 60,000 pieces are made annually. The average selling price is $2 legal gold ($1.89 United States currency) per square meter, or $0.175 per square foot.

In Medellin similar material is manufactured. The quality is equal to that in Barranquilla, but the cost is somewhat higher because of the greater cost of the raw materials delivered at Medellin. A square meter of "mosaico" delivered ready for setting in the latter city costs, on an average, $3.50 legal gold ($3.30 United States currency), or $0.307 per square foot.

In Bogota these tiles are produced with the use of the locally made Portland cement. Owing to the use of this local cement the average price is somewhat lower than at Medellin, but it is higher than at the coast. The average price in Bogota is $3 legal gold ($2.83 United States currency) per square meter, or $0.263 per square foot.

Both hydraulic power and hand presses are used in making "mosaicos" in Colombia. The material is in favor on account of its low cost and the extensive range of designs and colorings obtainable.

TERRAZZO FLOORING.

Except to a small extent for steps and thresholds, terrazzo composed of marble chips and Portland cement mortar is not used in Colombia. The floors of the houses are either paved with flat bricks or hydraulic tiles or finished in wood (mostly native). In Medellin and Bogota the native woods are used for finished floors, the harder qualities being selected to resist the ants that attack the softer woods, both native and imported.

GLAZED WALL TILES.

Only a very small quantity of glazed wall tiling has been imported into Colombia. It is only during the past few years that modern sanitary plumbing fixtures have been imported, and with the gradually increasing use of these materials, tiles (principally of local manufacture) have been used to finish the walls and floors of the bathrooms.

There are two factories in Bogota and one at Caldas, near Medellin, where glazed tiles are manufactured. At Bogota blue, rose-colored, and white tiles are made, measuring 8 by 8 by 1½ inches. These tiles are used for bathrooms and kitchens and sell for $4 legal gold ($3.77 United States currency) per square meter, or $0.35 per square foot. In the same city another factory occasionally makes an enameled tile in several colors. These tiles are very hard and nonabsorbent, measure 6 by 6 inches, and sell at 6 cents gold ($0.0566 United States currency) per piece, or $0.226 per square foot.

At Medellin the local tiling is known as "Caldas brick" and is rather extensively used for finishing baths, troughs, lavatories, and kitchens. The materials manufactured have the following dimensions, weights, and selling costs in Medellin:

Tiles of white or jasper color, 3.94 by 3.94 inches by 0.3 inch, weight 4.93 ounces—$0.04 legal gold ($0.0377 United States currency) per piece, equal to $0.223 per square foot.

Tiles of yellow or orange color, 4.13 by 4.13 inches by 0.59 inch, weight 10.58 ounces—$0.05 legal gold ($0.047 United States currency) per piece, equal to $0.398 per square foot.

Tiles of yellow or jasper color, 5.90 by 5.90 inches by 0.59 inch, weight 20.3 ounces—$0.05 legal gold ($0.047 United States currency) per piece, equal to $0.194 per square foot.

All the imports of glazed tiles into Colombia for the year 1915 originated in the United States and had a value of $218. The total weight was 4,988 pounds.

The architects of Bogota, Medellin, and Barranquilla are familiar with the tiles of American manufacture and expressed satisfaction with the product. In the past Spanish tiles 8 by 8 inches were imported. The color designs were attractive, but the quality of the tile was said not to be so good as that of the product coming from the United States.

CLAY ROOFING TILES.

Clay roofing tiles of Roman or Spanish and French patterns, from materials made in the country, are used more than any other kind of roofing material. The custom of using these tiles has come down from the days of the colonization of the country by the Spaniards. The material is made in the larger cities in the brickyards and in the smaller towns in many small yards by the natives, who bring the material by cargo mules to the places where buildings are being constructed. In the cities the material is sometimes delivered by carts. The material is of an ordinary grade and, as a rule, porous and not well burned. The tiles are laid with wet clay and mud or lime mortar placed on a roof frame covered with cane, small timbers, or wood lath.

The prices of the product in the different localities are such that competition from other materials is limited to galvanized, plain, and corrugated sheet steel. The latter material is not used as extensively in Bogota as in the places with lower elevation, on account of the cost of freight to the latter city from the coast.

The cost of the Spanish-pattern clay tiles made by hand in Bogota ranges from $18 to $30 legal gold ($16.98 to $28.30 United States currency) per thousand and of the French pattern from $35 to $40 legal gold ($33.02 to $37.73 United States currency) per thousand. In Medellin the Spanish-pattern tiles cost $20 legal gold ($18.87 United States currency) per thousand. In the latter city the average cost in place is $0.40 legal gold ($0.38 United States currency) per square meter, or $0.035 per square foot.

In all Colombia it is estimated that some 3,000,000 to 4,000,000 clay roofing tiles are made annually. Of these about 600,000 are made and consumed in Bogota.

In addition to the above tiles, houses with flat roofs, when not made of reinforced concrete, are covered with flat red tiles called "baldosas," which measure 25 centimeters (9.84 inches) by 12.5 centimeters (4.92 inches) by 2.5 centimeters (1 inch). They are laid in a double layer with broken joints on top of wood lath into a bed of mortar composed of lime and sand. No waterproofing is placed on top nor is flashing used, with the result that the majority of these roofs leak during the rainy season and are by no means satisfactory.

In the year 1915 a small quantity of roofing tiles was imported from England. This material weighed 4,498 pounds and was valued at $158.

CEMENT TILES.

Tiles of French pattern, molded in cement mortar, are coming into use in Barranquilla. These tiles are of exactly the same pattern as the clay roofing tiles known as French tiles. They are kept in the yard for four months after being cast and sell for $45 legal gold ($42.45 United States currency) per thousand.

In Bogota four or five years ago an experiment was made with cement tiles for roofs. It is reported that the result was unsatisfactory.

ASBESTOS SHINGLES.

Asbestos shingles have been used by the Government on several important buildings, among them the Palace of San Carlos, in Bogota. The cost of the material delivered is high, however, and its use has been restricted on this account. Most of the asbestos imported is used for insulating steam pipes and boilers. It is imported in sheets and in powder.

OTHER ROOFING MATERIALS.

In Bogota the flat roofs made of reinforced concrete are usually capped with native asphalt. Composition roofings have not been used to any great extent in Colombia.

Slate materials have not been used in Colombia for roofing or sanitary work.

MATERIALS FOR INTERIOR FINISH.

MILLWORK.

Millwork is all made in the country, the principal woods used being cedar, mahogany, native pine similar to bass wood, and nogal. In the colder climates amarillo, susca, pata de gallo, and chuquaca are used for floors. In the hot climates dinde, diomate, granadillo, and guayacan are used for beams, floors, and trim. Mahogany is also used in the hotter climates for trim. These woods are of very good quality and beautifully grained. In Medellin cumin is used for floors and structural work. For doors and interior trim cedar is most used in Medellin.

American millwork is not imported on account of the greater cost of the material delivered and because the stock sizes of the American firms are generally too small. In the cities in the hotter parts of the country the building regulations prescribe a minimum height of 4.5 meters (14 feet 9 inches) from floor to ceiling in dwellings, and all openings must be in proportion to this height. The low wages of carpenters, ranging on the coast from $1 to $1.50 per day and in Bogota from $0.80 to $1 per day, bring the cost of handmade millwork down to a relatively low figure. This class of work may be contracted for in Bogota at $6 to $7 per square meter ($0.56 to $0.65 per square foot). The value of the material in a square meter of door work ranges from $1.50 to $2, or $0.14 to $0.18 per square foot. The above prices are in Colombian legal gold. The exchange at the time of the writer's investigation averaged $1.06.

METAL FRAMES AND SASH.

With the facilities for supplying wood millwork and the lack of high buildings, together with the rarity of conflagrations, there is little likelihood of a demand for metal frames and sash, at least until the present height of buildings is increased and greater risk from fire is thereby introduced. For power houses and mill buildings where additional durability is desirable the solid-section sash and frame should find application. This will require propaganda work on the part of the manufacturers.

SHEET-METAL WORK.

Gutters and downspouts for buildings are made in the country from imported materials. Very little metal flashing and skylight work is used. Such skylights as are installed are made locally, the framework being principally of wood. Metal ceilings are coming into use in the interior, and many installations are to be found in Bogota and Medellin.

No ornamental sheet-metal work, such as cornices, brackets, and other molded members for the fronts of buildings, was found in Colombia.

ORNAMENTAL IRONWORK.

The material for light ironwork is imported principally from the United States. Owing to the high cost of iron and steel in Bogota, ornamental ironwork is used only to a small extent. The wholesale price per quintal (110.2 pounds) is $10 legal gold ($9.43 United States currency). For small quantities the prices range from $12 to $15 legal gold ($11.32 to $14.15 United States currency) per quintal. These prices are equivalent to $171.14 per ton wholesale and $205.40 to $256.80 per ton retail.

The workmen have considerable skill and are able to manufacture the designs, both ordinary and ornamental, that find application in building construction work. On account of the excessive cost of freight on manufactured ornamental ironwork, interior railings, grilles, etc., are also made in the cities where the material is used. The only ornamental work imported to any extent consists of lamps, which have been brought in from Germany, Belgium, France, Spain, and the United States.

It may be assumed that, except in rare cases of ornamental building work in the coast cities of Barranquilla, Cartagena, and Santa Marta, there is a small market for manufactured ornamental ironwork.

MARBLE.

In Cartagena and Barranquilla the entrances of many of the houses are paved with marble imported principally from Italy. This material, except for monumental purposes, is rarely used in the interior on account of the excessive cost of the material delivered at the interior cities; there are a few examples, however, such as the staircase of the building belonging to the Compañía de Seguros, Bogota, and in the Governor's house, Medellin.

The marble in the shape of floor tiles, polished and unpolished slabs imported into Colombia during the year 1915 was as follows: Dutch West Indies, 0.48 ton, valued at $51; France, 1.87 tons, valued at $767; Italy, 145.29 tons, valued at $4,810; Netherlands, 0.14 ton, valued at $36; Spain, 4.63 tons, valued at $265; United States, 4.66

tons, valued at $1,287; other places, 0.14 ton, valued at $21; total, 157.21 tons, valued at $7,237. Of the total, Italy supplied 92 per cent of the tonnage and 66 per cent of the value, the United States 3 per cent of the tonnage and 18 per cent of the value.

Marble of good quality is to be found in several parts of Colombia. A quarry is now being worked to some extent near the town of Chiquinquira to the north of Bogota. At Quipile (Anolaima), near the Girardot railway, a very fine white marble is found, and to the east of Pasto another large deposit has been discovered which is thought to be superior to that near the Girardot railway.

WINDOW GLASS.

Before the present war most of the window glass imported into Medellin came from Belgium, where the material was said to be better and cheaper than elsewhere. At present most of the glass comes from the United States, but three difficulties are encountered in the present business—high prices, unsatisfactory packing, and slowness in the dispatch of the orders in the United States. In certain cases the manufacturers and shippers of glass in the United States have improved their methods of packing and shipping as a result of data received from prominent importers of this class of material in Colombia, but in general the breakage is often extraordinary, and in one case of special glass ordered for a new house in Medellin it was necessary to order the glass twice in order to complete the work. There have been other cases where the glass in shipments has arrived completely broken, and it was necessary to purchase the required glass locally in order to finish the work. It is believed that after the war, if the prices are not lowered and the packing improved, the trade will return to Belgium.

The sizes of glass used in Medellin vary from 10 by 10 inches to 40 by 48 inches. The boxes, gross weight, should not be more than 70 kilos (154.28 pounds), because if heavier the boxes are knocked about too much, with the result that the contents are invariably badly broken. As customs duties are by gross weight, packing should be solid but light. The Belgian glass is packed in this manner.

Medellin uses annually about 10,000 boxes of glass of 70 kilos (154.28 pounds) each. There are two glass factories in Medellin making bottles, flasks, etc. They have tried to manufacture window glass, but thus far the operation has been a failure.

In Medellin there is very little demand for large panes of glass owing to the difficulty of transporting into the country large boxes containing glass. The consumption at present consists mostly of single-thickness transparent glass; some colored, opaque, maze, and thin figured glass is also sold.

In Bogota some of the dealers carry large stocks of plain window glass. One dealer had as many as 3,000 boxes on hand when interviewed, and he has the custom of having shipments constantly on the road; these are received periodically, with the result that he is always in possession of a good assortment of sizes for his trade. Bogota has a local glass factory that produces bottles for beverages and also plain window glass of an indifferent grade. This factory produces about $4,000 worth of plain window glass per month, or approximately

$50,000 worth per annum. The largest sheet of glass manufactured is 60 by 70 centimeters (23.62 by 27.56 inches) and 3 millimeters (0.118 inch) in thickness. The local manufacturer is able to sell his product for approximately 50 per cent of the prices for which imported glass is sold in Bogota.

Detailed import statistics for only one year were found available in Bogota. As regards glass for construction, the 1915 figures follow: France, $406; Italy, $50; United Kingdom, $614; United States, $12,551; other places, $58—a total of $13,679, of which the United States sold 91.76 per cent.

It has been suggested by some of the better architects in Colombia that there would be a market for the better grades of glass products, such as art glass for the first-class residences, prism glass, glass for showcases, and mosaic glass. At present only plain glass manufactures are used.

BUILDERS' HARDWARE.

Large quantities of hardware are imported from the United States. Formerly the light locks, which were necessary on account of the light construction of the stiles and rails of windows and doors, were imported from Europe. These patterns of locks have been successfully duplicated by American manufacturers and may be found in the stocks of the principal hardware merchants in Colombia. These cheaper and lighter materials are imported on account of customs charges being by weight. The charges are classified according to the kind of metal of which the locks are made, and the tariff classifies various groups which it is important to know. Woodwork is usually lighter in Colombia than in the United States, and the majority of the hardware is applied or superimposed to the doors and windows. Doors and windows are usually double, with two leaves.

Decorated hardware is coming into use, and that from the United States is much esteemed.

The sizes of the stiles of doors should be studied by the manufacturers in order that the better grades of hardware may be made to fit into the door without destroying the integrity of the construction. In Medellin the size of the stile into which the lock is usually placed is 3½ by 1¾ inches.

The imports for 1915 follow: France, 45 pounds, valued at $15; Isthmus of Panama, 32 pounds, valued at $24; Netherlands, 2,504 pounds, valued at $470; United Kingdom, 387 pounds, valued at $696; United States, 22,463 pounds, valued at $5,062; other places, 7,956 pounds, valued at $1,359; total, 33,377 pounds, valued at $7,626. Of the total value the United States sold 66 per cent.

In normal times both England and Germany sell large quantities of light hardware for interior finishing work, principally for the reason that these countries have taken pains to study the local conditions of construction and have also supplied a comparatively lightweight class of material that has appealed to the owners and the dealers. Some of the American manufacturers have begun to supply the lighter-weight materials, and the examples of these goods inspected in Bogota in the warerooms of one of the principal dealers were found to be of excellent manufacture and satisfactory to the dealer, who commented on the material in a very favorable way. The architects of Colombia are very much pleased with the better-finished hardware products and are good advocates of the finer grades of hardware, which they generally endeavor to apply, especially where first cost is not the prime consideration. It remains for the manufacturers to develop further this line of trade in Colombia and to maintain a firm grasp on the present business.

The catalogue No. 1 of the Unión Cerrajera, Sociedad Anónima, Mondragon, Guipuzcoa, Spain, on file in the Department of Commerce, illustrates some of the patterns that have found favor in Bogota. It should be remembered in this connection that the manufacturer should study to supply locks, etc., that have more than one kind of metal, packed in such a way that the dealer may do a certain amount of assembling of parts in his warehouse from packages containing each kind of metal in separate boxes, in order that he may receive the full advantage of the customs duties, which provide different rates for the several kinds of metal used in manufacture.

PAINTS, COLORS, AND LINSEED OIL.

Up to 1914 paint and linseed-oil products were received principally from England and Germany. Since the beginning of the war these materials have been coming from the United States. Colors in the form of powder to be mixed with linseed oil are most used. The use of prepared paint has been relatively small, but these materials are gaining ground. In the stores of the principal cities and towns good stocks of paints are carried. That in most common use is white lead from England and Germany.

In Medellin one of the principal dealers in linseed oil reports that most of his imports of this material in the past have come from England, where the oil has been of a better quality and less expensive. The users of paint in Medellin require quick-drying materials. It has been observed that the linseed oil coming from the United States does not dry readily. A sample of the oil from England has been forwarded to the New York office of the Bureau of Foreign and Domestic Commerce for examination by interested persons. The oil is preferred in gallon cans, but some comes in iron drums of 75 kilos (165.16 pounds) gross.

A small quantity of crude oil is consumed in cases of 12 to 16 gallons. This material comes from the United States, is well packed, and gives satisfaction.

It is calculated by Medellin merchants that at least 5,000 gallons of linseed oil is consumed in the city each year.

Imports of linseed oil into Colombia during 1915 were as follows: Dutch West Indies, 122 gallons, valued at $66; France, 210 gallons, valued at $116; Netherlands, 333 gallons, valued at $199; Spain, 226 gallons, valued at $139; United Kingdom, 10,995 gallons, valued at $5,755; United States, 35,087 gallons, valued at $19,495; other places, 3,735 gallons, valued at $2,327; total, 50,708 gallons, valued at $28,097. Sixty-nine per cent, both by volume and value, of the linseed oil was imported from the United States. The average declared value per gallon was $0.556 for that coming from the United States and $0.523 for that from the United Kingdom.

In addition to the basic material, linseed oil, the following painting materials and paints were imported into Colombia during the year 1915:

Turpentine—Dutch West Indies, 5 gallons, valued at $7; France, 82 gallons, valued at $74; Isthmus of Panama, 10 gallons, valued at $10; Italy, 15 gallons, valued at $70; Spain, ½ gallon, valued at $2; United Kingdom, 717 gallons, valued at $370; United States, 16,457 gallons, valued at $6,789; total, 17,286½ gallons, valued at $7,322, giving an average price per gallon of $0.4236. The average price of the material coming from the United Kingdom was $0.516 and of that from the United States $0.4125. This country sold 95 per cent of the volume and 92 per cent of the value of the turpentine imported by Colombia.

White lead—Dutch West Indies, 6 pounds, valued at $6; France, 7 pounds, valued at $0.50; Italy, 6,876 pounds, valued at $377; Netherlands, 441 pounds, valued at $27; United Kingdom, 8,596 pounds, valued at $456; United States, 10,409 pounds, valued at $1,496; other places, 242 pounds, valued at $14; total, 26,579 pounds, valued at $2,376.50, giving an average price per pound of $0.0894. The average price of material coming from Italy was $0.0548, from the United Kingdom $0.0524, and from the United States $0.144 per pound. Italy sold 26 per cent of the volume and 16 per cent of the value, the United Kingdom 32 per cent of the volume and 19 per cent of the value, and the United States 39 per cent of the volume and 63 per cent of the value of the white lead imported by Colombia.

Varnishes—Dutch West Indies, 70 gallons, valued at $24; France, 328 gallons, valued at $231; United Kingdom, 515 gallons, valued at $355; United States, 13,103 gallons, valued at $8,335; other places, 36 gallons, valued at $89; total, 14,052 gallons, valued at $9,034, giving an average price per gallon of $0.643. The average price of the material coming from the United Kingdom was $0.69 per gallon, from France $0.7043, and from the United States $0.636. This country sold 93 per cent of the volume and 92 per cent of the value, the United Kingdom 3.7 per cent of the volume and 3.9 per cent of the value, and France 2.3 per cent of the volume and 2.6 per cent of the value of the varnish imported by Colombia.

Prussian and ultramarine blue—Dutch West Indies, 26 pounds, valued at $7; France, 786 pounds, valued at $86; Netherlands, 14,090 pounds, valued at $490; Isthmus of Panama, 33 pounds, valued at $5; Spain, 198 pounds, valued at $49; United Kingdom, 4,754 pounds, valued at $472; United States, 87,757 pounds, valued at $3,841; other places, 1,598 pounds, valued at $143; total, 109,242 pounds, valued at $5,093, giving an average price per pound of $0.0466. The average price of the material coming from the Netherlands was $0.0348 per pound, from the United Kingdom $0.099, and from the United States $0.0438. This country sold 80 per cent of the volume and 75 per cent of the value, the United Kingdom 4.4 per cent of the volume and 9.2 per cent of the value, and the Netherlands 13 per cent of the volume and 9.6 per cent of the value of the Prussian and ultramarine blue coloring materials imported by Colombia.

White zinc—Dutch West Indies, 10 pounds, valued at $1; France, 3,108 pounds, valued at $301; Italy, 115 pounds, valued at $7; Isthmus of Panama, 203 pounds, valued at $15; Netherlands, 1,184 pounds, valued at $73; United Kingdom, 27,353 pounds, valued at $2,037; United States, 93,923 pounds, valued at $8,918; other places, 8,513 pounds, valued at $740; total, 134,409 pounds, valued at $12,092, giving an average price per pound of $0.0899. The average price of the material coming from France was $0.097 per pound, from the United Kingdom $0.074 per pound, and from the United States $0.095. This country sold 70 per cent of the volume and 75 per cent of the value, the United Kingdom 20 per cent of the volume and 17 per cent of the value, and France 2.3 per cent of the volume and 2.5 per cent of the value of the white zinc imported by Colombia.

Prepared colors—France, 90 pounds, valued at $15; Italy, 1,984 pounds, no value declared; United Kingdom, 45,940 pounds, valued at $2,561; United States, 102,645 pounds, valued at $8,076; other places, 5,365 pounds, valued at $632; total, 156,024 pounds, valued at $11,284, giving an average price per pound of $0.0723. The average price of the material coming from the United Kingdom was $0.056 per pound and of that from the United States $0.078. This country sold 66 per cent of the volume and 71 per cent of the value and the United Kingdom 29 per cent of the volume and 23 per cent of the value of the prepared colors imported by Colombia.

Lump and powdered colors—France, 2,581 pounds, valued at $112; Italy, 3,738 pounds, valued at $283; Netherlands, 829 pounds, valued at $43; Spain, 1,739 pounds, valued at $103; United Kingdom, 11,207 pounds, valued at $898; United States, 23,363 pounds, valued at $2,404; other places, 966 pounds, valued at $35; total, 44,423 pounds, valued at $3,878, giving an average price per pound of $0.0873. The average prices of this class of material from the several countries are as follows: France, $0.043; Italy, $0.078; Spain, $0.0592; United Kingdom, $0.08; United States, $0.103 per pound. This country sold 53 per cent of the volume and 62 per cent of the value, the United Kingdom 25 per cent of the volume and 23 per cent of the value, Italy 8.4 per cent of the volume and 7.3 per cent of the value, France 5.8 per cent of the volume and 2.8 per cent of the value, and Spain 3.9 per cent of the volume and 2.6 per cent of the value of the lump and powdered colors imported by Colombia.

Enamels ready for use—Dutch West Indies, 101 pounds, valued at $6; Italy, 1,422 pounds, valued at $229; United Kingdom, 335 pounds, valued at $58; United States, 18,289 pounds, valued at $2,682; total 20,147 pounds, valued at $2,975, giving an average price per pound of $0.148. The average price of material coming from Italy was $0.161, from the United Kingdom $0.173, and from the United States $0.146. This country sold 90.8 per cent of the volume and 90 per cent of the value of the prepared enamels imported by Colombia.

Gum-lac—France, 31 pounds, valued at $2; United States, 2,506 pounds, valued at $617; other places, 519 pounds, valued at $107; total, 3,056 pounds, valued at $726, giving an average price per pound of $0.238. The average price of material from the United States was $0.246. This country sold 82 per cent of the volume and 85 per cent of the value of the gum-lac imported by Colombia.

Red lead—Isthmus of Panama, 26 pounds, valued at $3; Netherlands, 112 pounds, valued at $5; Spain, 417 pounds, valued at $11; United Kingdom, 11,767 pounds, valued at $731; United States, 29,311 pounds, valued at $1,838; other places, 660 pounds, valued at $39; total, 42,293 pounds, valued at $2,627, giving an average price of $0.062. The average price of material from the United Kingdom was $0.062, and from the United States $0.0627. The United Kingdom sold 28 per cent of the volume and 28 per cent of the value, and the United States sold 69 per cent of the volume and 70 per cent of the value of the red lead imported by Colombia.

Lampblack—France, 242 pounds, valued at $15; Isthmus of Panama, 44 pounds, valued at $5; United Kingdom, 1,130 pounds, valued at $641; United States, 4,921 pounds, valued at $420; total, 6,337 pounds, valued at $1,081, giving an average price of $0.17 per pound. The average price of the material coming from the United Kingdom was $0.57 per pound, and from the United States $0.085. The United Kingdom sold 18 per cent of the volume and 60 per cent of the value, and the United States 78 per cent of the volume and 39 per cent of the value of the lampblack imported by Colombia.

Powdered ochres, earthy materials—Dutch West Indies, 771 pounds, valued at $8; France, 344 pounds, valued at $48; Italy, 1,587 pounds, value not given; Netherlands, 240 pounds, valued at $44; Spain, 4,214 pounds, valued at $287; United Kingdom, 12,131 pounds, valued at $695; United States, 73,411 pounds, valued at $3,451; other places, 1,509 pounds, valued at $29; total, 94,207 pounds, valued at $4,562, giving an average price of $0.0484 per pound. The average prices of the materials from the several countries follow: France, $0.14; Spain, $0.068; United Kingdom, $0.057; United States, $0.046. This country sold 78 per cent of the volume and 75 per cent of the value, the United Kingdom 13 per cent of the volume and 15 per cent of the value, and Spain 4 per cent of the volume and 6 per cent of the value of the powdered ochres imported by Colombia.

Red oxide of iron—Spain, 1,446 pounds, valued at $49; United Kingdom, 2,488 pounds, valued at $81; United States, 7,216 pounds, valued at $378; total, 11,150 pounds, valued at $508, giving an average price of $0.0456 per pound. The average prices of the materials from the several countries follow: Spain, $0.034; United Kingdom, $0.033; United States, $0.052. This country sold 65 per cent of the volume and 74 per cent of the value, the United Kingdom 22 per cent of the volume and 16 per cent of the value, and Spain 13 per cent of the volume and 10 per cent of the value of the red oxide of iron imported by Colombia.

Ordinary paints—France, 163 pounds, valued at $8; Isthmus of Panama, 1,818 pounds, valued at $170; Italy, 4,188 pounds, valued at $605; Netherlands, 51 pounds, value not given; United Kingdom, 81,420 pounds, valued at $5,066; United States, 233,960 pounds, valued at $20,511; other places, 7,074 pounds, valued at $302; total, 328,674 pounds, valued at $26,662, giving an average price per pound of $0.0811. The average price of the materials from the United Kingdom was $0.062, from Italy $0.144, and from the United States $0.087 per pound. This country sold 72 per cent of the volume and 77 per cent of the value, the United Kingdom 25 per cent of the volume and 19 per cent of the value, and Italy 1.3 per cent of the volume and 2.3 per cent of the value of the ordinary paint material imported by Colombia.

In Medellin the principal base used for paints is white or oxide of zinc. White lead is not used on account of the workmen's fear of the colic. The quality of oxide of zinc coming from England and Germany is in favor. This kind of material is required to be finely ground and light—that is to say, voluminous. The material coming from the United States is not liked in Medellin. White zinc must be genuine, with no adulteration. Medellin uses about 50,000 pounds of this material per year. Other colors, green, yellow, blue, etc., have been bought preferably from France and England. They come in powder in packages of 100 kilos (220.4 pounds). American packing of these materials is satisfactory. Mixed paints are little used in Medellin. Copal varnishes from the United States are preferred to European. They come in gallon tins, 16 gallons to the case, and American packing is satisfactory.

For railway bridge work in Antioquia a special paint called Nobrac has been used. From 1,000 to 1,500 gallons are consumed each year. Graphite paints to the extent of 150 to 200 gallons annually are also used by the Antioquia Railway. Before the war an English paint called Atlas Ruskilld was imported by the railway for metallic structures. The quantity of this paint imported annually did not exceed 150 to 250 gallons. There was also imported from Belgium for use on rolling stock a paint called Ripolin, the quantity amounting to 1,500 to 2,000 gallons annually.

MISCELLANEOUS MATERIALS.

PLUMBING AND SANITARY FIXTURES AND VITRIFIED SEWER PIPE.

The sanitary conditions in the cities throughout the Republic are generally unsatisfactory. Water supply and sewage disposal have been neglected, principally on account of the lack of funds. Only the larger cities of the country have water supplies with house-to-house connections. Very little attempt is made to purify the water, and in the majority of cases no system of purification whatever is used. In the smaller towns the water is generally brought to the main plaza or public square by a pipe line terminating in a public fountain that flows continuously. From this source persons or animals carry the water to the houses. The sewage disposal is, if anything, in a less favorable condition than the water supply, the open pit being found in nearly all the towns. In the larger cities, such as Barranquilla and Cartagena, sealed cesspits are used in the better class of dwellings. Bogota is the only city in the Republic that has a sewer system, and this is now inadequate. In 1908 proposals were received from an English engineering corporation to introduce sanitary measures, including the canalization of the two rivers that flow through the city. The contract was never executed. The city, however, is at present carrying out the work of canalizing the rivers, and this work, when finished, will greatly improve the health conditions of Bogota.

A thorough sanitation of the greater part of the Republic is necessary, but in most of the towns and cities the condition of the municipal treasury is such that improvements of value can not be undertaken. As an exception to this condition it may be mentioned that the city of Medellin is at present constructing a new aqueduct, the cost of which is being borne by the city.

Piping and fittings and the more expensive sheet and other metals generally used in plumbing work in Colombia have been imported. The fixtures, such as water-closets, urinals, lavatories, and bathtubs, have been imported for the most part and otherwise supplied by home manufacturers. Sewer pipe for underground work and special work above ground, where well-made, small-diameter piping is sometimes used, is all made in the country.

The plumbing fixtures, piping, and accessories imported in 1915, the only year for which detailed statistics were available at the time of the writer's investigation, originated in the following countries: Dutch West Indies, materials valued at $47; France, $34; Isthmus of Panama, $57; Netherlands, $15; Spain, $367; United Kingdom, $14,350; United States, $51,519; other places, $1,832; total, $68,221. The United Kingdom sold 21 per cent and the United States 75 per cent of the total. In addition to the above, $6,000 worth of tanks, boxes, and baths (including showers) were imported in 1915.

Importers of sanitary fixtures in Bogota estimate that from $20,000 to $25,000 worth of fixtures are imported and sold in Bogota annually. This represents a selling price in Bogota of from $40,000 to $50,000, which includes the cost of the materials, delivered, plus the profits.

In Medellin the use of sanitary fixtures is increasing from day to day. The installations consist of water-closets, lavatories, and baths, most of which, architects report, come from the United States.

In Bogota there are three factories where sanitary fixtures, except bathtubs, are made. The oldest business is called "Faenza" and belongs to José Maria Saiz & Co. In the fixture line they make urinals and water-closets principally, and lavatories to a less extent. The material used is a white clay. The articles are first burned without glaze and afterwards glazed and burned again at a lower heat. By this process the body remains porous and the glaze sometimes cracks. The shapes, workmanship, and general appearance are very good.

The second factory, called "Etruria," is located in the southern part of the city and makes the same kind of wares as the first factory. Fancy crockery is also made. The business is conducted by a man of enterprise and ability.

At Plantagenet Moore's sewer-pipe works a varied line of sanitary fixtures are made. These include closet fixtures, from the cheapest, made in common brown vitrified clay, to the best glazed cream-colored fixture. All articles made at this factory are vitrified and nonabsorbent. The body and the glaze are burned in one fire. All kinds of siphons or traps, bends for piping and sinks, are made in the same material.

Bathtubs have never been made in Colombia; they are all imported, mostly from the United States. Few bathtubs other than cast-iron enameled have been imported. The pure porcelain bathtubs and other fixtures, owing to the many changes necessary in shipping, have generally arrived broken.

There is only one factory in Bogota where vitrified sewer pipe is made. This factory was established about 11 years ago by Plantagenet Moore. The industry had previously been unknown in the country, and the very small quantity of pipe used for a few purposes was imported. In Bogota there had been made from time immemorial, by hand, ordinary drain tiles from common brick clay, not vitrified or glazed, conical in shape so that the small end would fit into the large one to make the joint. A sort of step remained at each joint. Before the establishment of the present city waterworks, some 30 years ago, all public and private water supplies were piped with these tiles.

At the sewer-pipe works the pipes are made by machinery from a mixture of refractory clay and shale ground in a pan mill. The pipes, after being molded, are burned to vitrification in down-draft semicontinuous kilns and glazed with a mixture of alumina, silex, lime, and soda. The pipes are made cylindrical, with socket joints in sizes from 3 to 16 inches in diameter.

It is said that at first there was a great deal of difficulty in introducing the material. The builders were not familiar with the pipes and found many whimsical inconveniences in their use. These objections have been overcome, and the demand is increasing. An extension to the factory is now being made. All machinery was imported from England.

The manufacturer sells the pipe at present in accordance with the following price list: Three-inch diameter, $0.40 legal gold per meter (3.28 feet), equivalent to $0.115 United States currency per foot; 4-inch diameter, $0.55 legal gold per meter ($0.158 United States currency per foot); 6-inch diameter, $1 legal gold per meter ($0.2875 United States currency per foot); 9-inch diameter, $1.50 legal gold per meter ($0.43⅛ United States currency per foot); 12-inch diameter, $2 legal gold per meter ($0.575 United States currency per foot); 16-inch diameter, $2.60 legal gold per meter ($0.747 United States currency per foot).

At Caldas, near Medellin, on the Ferrocarril de Amaga, Mejia & Echavarria, of Medellin, manufacture small glazed tile pipe in three dimensions, as follows: No. 1, length 37 centimeters (14.57 inches), interior diameter 10 centimeters (3.94 inches); No. 2, length 41 centimeters (16.14 inches), interior diameter 23 centimeters (9.06 inches); No. 3, length 44 centimeters (17.32 inches), interior diameter 30 centimeters (11.81 inches). The consumption of the two larger sizes is very small. The 3.94-inch diameter has the greatest sale, approximately 5,000 pieces of this size being sold per annum at $0.20 legal gold per piece ($0.19 United States currency).

The makers have a capacity at their works for the production of much greater quantities of this pipe than are at present consumed. The material is used principally for interior plumbing work. A line of specials is also made, chiefly elbows and traps, for use in connection with the straight lengths of pipe for completing the plumbing work.

CONCRETE CHIMNEYS.

In Barranquilla, at the Fábrica Tejidos Obregon, there is a concrete chimney of the Weber design. The chimney is giving good service, and there should be a market for this type of chimney in the coast cities of Colombia where cement and reinforcing steel may be purchased at fair prices.

EXPLOSIVES.

The explosives used in Colombia for construction and mining work are imported, in normal times, from the United States, Germany, France, and the United Kingdom. There is no fixed regulation governing the quantity of this material that may be imported by any company, firm, or individual at any one time, but anyone attempting to import unusual quantities in one shipment would doubtless be required to explain the reasons for the shipment and its proposed destination.

In 1915 the United States and the United Kingdom were the only countries that shipped explosives to Colombia. The United Kingdom sold 64.9 tons of dynamite, valued at $18,088, and the United States 86.9 tons, valued at $23,090. The total imports were 151.8 tons, valued at $41,178, giving an average price of $271.27 per ton. The average price of the material coming from the United Kingdom was $27.87 and from the United States $26.57 per ton of 2,000 pounds. The United States sold 57.2 per cent of the quantity imported by Colombia.

The larger percentage of the match rope or tape for mines came from the United Kingdom, which sold to Colombia 21,205 pounds, valued at $3,496. The United States sold 11,472 pounds, valued at $1,864. The total importation amounted to 32,677 pounds, valued at $5,360, with an average price of $0.164 per pound. The average price of the material coming from the United Kingdom was $0.165 and from the United States $0.1625 per pound.

In Medellin the two principal importers of explosives bring in approximately 75 cases of gelatin containing 50 pounds per case, 15 cases of dynamite containing 50 pounds each, 15 cases of gelignite containing 50 pounds each, and 40 cans of black powder containing 25 pounds each; also fulminates and tape in the proportion of 10 fulminates and 10 feet of tape to each pound of explosive. These quantities are consumed for the most part by the government of the Department of Antioquia.

In Medellin in general, explosives are employed for mining, loosening earth, and making public roads, both rail and wagon. Apart from the consumption by the departments of the government the greatest use is for mining.

Before the war the explosives, aside from the black powder, were imported principally from Hamburg and Glasgow. The black powder has come from the United States. It is reported that all of this class of material now comes from the United States.

CONSTRUCTION MACHINERY, INSTRUMENTS, AND TOOLS.

WORKMEN'S TOOLS AND MACHINERY FOR CONTRACTORS.

Importations of tools for workmen are generally made by the merchants and subject to the usual customs charges. The Government has a store in Bogota for furnishing the department of roads with tools. Importations for this Government store are made by the local merchants.

The Government and some private contractors are beginning to use machinery for road-construction work. The construction of buildings, however, especially in the interior, is carried out, with few exceptions, by hand labor as in colonial times. In the interior constructions of reinforced concrete and with metal framework have been used but little on account of the high cost of the basic materials. Steel in bars now costs $171 United States currency per ton of 2,000 pounds, cement of local manufacture $8.49 to $9.50 per barrel of 180 kilos, and imported cement $9.85 to $10.19 per barrel.

Although the local cement made in Bogota is of fair quality, it lacks uniformity of resistance, and contractors and engineers do not use the material except in rare cases for reinforced concrete.

Buildings at present, in the interior, are made of stone and brick, roofed with earthen tiles. On this account concrete mixers are little used. They are beginning to be introduced, however, and notwithstanding the high cost of cement and reinforcing steel the consumption of these materials is increasing, and in time more concrete mixers should be used.

The first steam machinery outfit for road making was introduced in 1914 and consisted of steam tractors from Ruston, Proctor & Co., Lincoln, England, and stone crushers from Baxter, England. In the present year (1917) the Government has ordered, through a local Bogota firm, stone crushers of American make to be actuated by steam power. Steam dredges have been imported for canalizing some of the rivers; also steam pumps for waterworks in some of the towns. The last centrifugal pumps to arrive were shipped from New York for the city of Tunja. These pumps are operated with a gas motor. Motor trucks are not used in Colombia so much as might be desired, on account of the high price of gasoline, which now costs in the interior about $0.90 per gallon.

The Government usually gives its orders for materials and machinery to business houses established in the country, which guarantee fulfillment of contract. These houses generally extend favorable facilities to the Government in the matter of payment, granting terms for the fulfillment of which certain rents or taxes are set aside. For example, with reference to any particular road, the income from taxes assessed for the road is devoted to maintenance of the road and the liquidation of accounts for machinery and materials purchased on credit terms for the road.

Well-drilling outfits of American manufacture are being used near the Carrara River by Pittsburgh interests. The Government dredges are principally of English manufacture. The Pato mines at Saragossa, on the Nechi River, use two electrically driven dredges furnished by the Uba Construction Co., of Oreville, Cal. The electrical machinery on these dredges is of General Electric Co. make. The Antioquia Dredging Co., an American stock company, owns and operates a Bucyrus dredge. This machine is equipped with De La Vergne crude-oil engines of the horizontal type. The Zancudo Co., of Medellin, which was organized in 1848, with mines in the Titiribi region to the southwest of Medellin near the Cauca River, employs 1,000 workmen and turns out annually $300,000 worth of gold and silver. This company purchases machinery to the value of $30,000 per annum.

The concrete mixers in use in the various parts of Colombia are of the following makes: Jaeger Machine Co., used by the Ferrocarril de Antioquia; "Big and Little" mixer, used by the Medellin Aqueduct, city of Medellin; Smith-Chicago, size 503, with small electric hoist on the same frame, both run by an electric motor with clutches on the mixer and elevator.

The Ferrocarril de Antioquia has a small Dodge No. 3 stone crusher, which has been used to some extent, but the experience of the company has shown that crushed stone can be broken at less cost by the native labor than by using the machine. This seems incredible, but one must consider the forces employed, which include not only the men and boys of the country but the women as well, who perform their regular tasks daily in breaking stone for road and railway work. The cost of breaking stone is $0.60 gold ($0.566 United States currency) per cubic meter, or $0.435 per cubic yard. The delivery along the line of railway and placing on the permanent way costs about one-third as much, or possibly $0.15 per cubic yard. These are practical figures and in a way explain the reason why more stone has not been broken by machine. Notwithstanding the low costs above given, the Ferrocarril de Amaga has under consideration at present the use of a stone-crushing outfit and the general superintendent of the company has commissioned a concern in the United States that builds crushers to submit details of cost and operation for an equipment to meet the demands of the railway.

Steam shovels for use on railway construction have been under consideration by the railways of Antioquia, but the economy of using this type of machine is rather uncertain, principally on account of the difficulty and expense of making the emplacements in a successive manner along the line of an economically planned set of cuts and fills. The difficulties may be readily understood from an inspection of ordinary profiles that obtain in Antioquia, Colombia, where a considerable amount of cut-and-fill earthwork is now being done. The following cost data on cuts and fills that are being made by the Ferrocarril de Antioquia at the present time will be of interest in considering the use of steam shovels for railway work in the Andes. Cuts in soft ground and high hills, where the wagons are filled automatically, have cost as low as $0.06 ($0.05⅔ United States currency) per cubic meter, or $0.0435 per cubic yard; same in low cuts, $0.0653 per cubic yard; hardpan, $0.0943 per cubic yard; rock, $0.18⅛ per cubic yard. Photographs accompanying this report (and available for inspection by interested persons) illustrate the manner of making some of the cuts on this railway, especially the method used in filling the industrial dump cars, which are operated by ordinary labor at $0.47 United States currency per day.

Considerable quantities of industrial track and "Koppel" type dump cars are being used throughout Colombia for railway and road work. Most of this class of equipment has formerly come from France, the cost of the material, delivered on the work, being more favorable than that of similar material originating in the United States. This is explained by the low initial cost of manufacture of the material in France. The sections of rail coming from France are very light and easy to handle on the work.

On account of the scant height of the buildings usually constructed in Colombia, little use has been made of the hoisting engine. As the country develops and more important structures are erected in the cities, use may be made of this important labor saver. The low initial cost of labor is the main reason why labor-saving machinery—construction equipment—has not been used to a greater extent.

The following statistics show the imports of small tools for the year 1915: Dutch West Indies, 2,578 pounds, valued at $109; France, 10,420 pounds, valued at $4,649; Isthmus of Panama, 291 pounds, valued at $153; Italy, 64 pounds, valued at $64; Netherlands, 1,592 pounds, valued at $392; Spain, 6 pounds, valued at $11; United Kingdom, 42,452 pounds, valued at $8,817; United States, 950,034 pounds, valued at $84,054; total, 1,007,437 pounds, valued at $98,249. The United States sold $94\frac{3}{10}$ per cent of the total weight and $85\frac{6}{10}$ per cent of the value of the small tools imported by Colombia.

In the Department of Antioquia a road roller of the Buffalo Pitts make has been in use for the past three years. The machine weighs 10 tons and has given very satisfactory results. Owing to the low cost of broken stone prepared by hand, rock crushers have not been used thus far by this Department. The Department, however, would like to receive propositions from builders of crushers setting forth the initial costs of the machinery and the economies of operation. The same Department would like to receive detailed information, prices, and conditions with regard to cables, sheet iron, chain, pulleys, piping and hose, fixed and moving materials, such as cars for portable tracks, and, in general, any labor-saving equipment that may be useful for road construction.

ENGINEERING AND SURVEYING INSTRUMENTS.

In Bogota the Librería y Papelería "El Mensajero" (Julio Escobar Saenz, proprietor) carries a line of Stanley instruments and engineers' and architects' supplies. These instruments are made in London and sent on consignment to the dealer, who makes a return report and payment for the instruments and supplies sold at the end of each six months. The line carried by the above house is very complete and consists of levels, transits, theodolites, hand levels, sextants, and a general line of engineers' and architects' supplies.

The engineering work of Colombia is carried on for the most part by native engineers, who have a society called Sociedad de Ingenieros, with headquarters in Bogota. Railroad and other work that has been financed by foreign capital has generally been carried out by engineers of the interests that have furnished the capital.

Most of the instruments used in Colombia have been of English make, though a few American instruments have been used.

The principal technical school in which engineering and surveying are taught is the Facultad de Matemáticas e Ingeniería, Bogota. The best local publication in which to advertise to reach the native engineers is the publication of their society, called Anales de Ingeniería, published monthly in Bogota. The principal daily newspaper, El Nuevo Tiempo, is also a good organ to use, as it is read by the best class of citizens in Bogota.

IV. COMMERCIAL PRACTICES AND REQUIREMENTS.

IMPORTATIONS AND SALES.

Until the year 1914 the greater part of the imports of hardware and ironmongery came from the United Kingdom and Germany, and importers placed their orders with commission houses or manufacturers' agents who gave clients from six to nine months' credit and charged a commission of from 3 to 5 per cent and interest at 6 per cent per annum. For cash shipments 2½ per cent commission was charged. These commission houses make up the consular invoices and attend to all details of shipment. Since the beginning of the European war shipments from Germany have been entirely suspended and those from England subject to many delays, with the result that importers have sought a new market in the United States.

Advantage has been taken of commission houses in New York who are accustomed to make shipments charging 5 per cent commission and granting credits of three or four months, subject to an interest charge of 6 per cent per annum. Shippers usually draw on customers at 60, 90, or 120 days, the drafts being discounted at the banks in New York, which subsequently collect through their foreign correspondents.

It has been observed by the importers that many American manufacturers are apparently unfamiliar with the requirements of export trade and seem fearful of committing errors in drawing up shipping documents, etc.; on this account the Colombian buyers prefer to deal with the commission houses established in New York.

One element of difficulty confronting the exporter is the customs tariff of Colombia, in respect to which shippers make many errors to the detriment of their customers. The tariff should be carefully studied by persons contemplating the sale of merchandise in the Republic.

The increase of American exports to Colombia since 1914 has been due to the war, and in order to retain the business American manufacturers should carefully study the Colombian markets. The larger merchants of Colombia do not consider it sufficient for the United States to send traveling salesmen to Colombia, as the salesmen are in the habit of selling to the retailers on the same terms as to the wholesale houses and thus spoiling the market. This custom has been observed in various instances among American traveling salesmen, with the result that the wholesale houses do not care to buy from such salesmen, since the larger merchant does not find it good business to compete against his own customers. The English houses have always been accustomed to protect their customers and never sell to the retail trade. This, it is believed, is largely the reason for their success.

With reference to the wholesale importers it may be stated with confidence that they fulfill their obligations, have a high regard for their credit, and are very strict. In Bogota especially failures are very rare.

PACKING.

It has been observed that American manufacturers, as a class, know comparatively little of the special conditions in Colombia, particularly as regards transportation facilities, and on this account their packing is generally not adapted to those conditions.

Packing for Colombia should be made a special study, as it involves requirements that would be superfluous in countries where there are adequate railroads. Different sections of Colombia call for different methods of packing. If a firm in Barranquilla or Cartagena orders goods, these may be shipped in cases or bales in which the contents may be of great weight, as the transportation is by sea and rail, with few transshipments. This is not the case, however, with freight for the interior, which is subject to a long journey and many transshipments from steamer to train, thence to river boat, and then again to train. Even though some of the river boats are provided with steam cranes, freight in the majority of cases is manhandled in the most primitive manner.

As a result of poor packing the goods are exposed to frequent damage, which may or may not be made good by the insurance companies; this is a detriment to importers, who, because of the frequency of this carelessness, must pay excessive rates.

Americans often pack merchandise for export as if it were destined to be moved only within the United States, not taking into consideration the customs regulations of Colombia, in which country duty must be paid on the packing the same as on the merchandise.

In the case of machinery shipments faulty packing is responsible for much damage by breakage, loss of parts, and the destruction of highly finished surfaces, to say nothing of damage by humidity. In most cases manufacturers pack heavy machinery fully erected in crates that fall apart on being unloaded from the steamer in Puerto Colombia. Manufacturers do not understand the necessity of packing machinery "knocked down," in parts, and seem to fear that there will be nobody competent to set it up at destination. At other times they take a machine apart and ship all the pieces loose in big boxes, with the result that at some point of transshipment the heavier parts break the smaller ones. In short, it may be suggested that American packing for shipment to Colombia is capable of distinct improvement, and this is one of the principal reasons why American machinery does not enjoy the credit in Colombia to which it would otherwise be entitled. It should be understood that these remarks represent merely a general impression on the part of the Colombian importers, as some American houses have sent representatives to the country to study existing conditions, and in their packing better results have been obtained. To show the lack of information on the part of some manufacturers, it is sufficient to cite the case (only too frequent) of packages weighing half a ton or even a whole ton marked "Mule-back transportation," when anyone who has ever been over the Andes knows that the animal does not exist that could carry a ton over the mountains.

For the reasons indicated above, many articles are not imported from the United States that can advantageously be purchased there, because not all American manufacturers carry out the instructions of the purchaser regarding the packing that is essential when goods are intended for the interior.

In the United States goods are moved by capable workmen and mechanical devices, minimizing the possibility of breakage, whereas in Colombia such workmen are scarce and very few labor-saving machines are employed.

It may be well to enumerate the necessary transfers of shipments on their way from the coast to Bogota, as follows: From steamer at Puerto Colombia to train, which takes the merchandise to Barranquilla; at Barranquilla from train to customhouse; from customhouse to the boats of the lower Magdalena River; from the lower Magdalena River boats at La Dorada to train, which takes the goods to Beltran. At Beltran the merchandise is unloaded from the train to be put aboard the steamers of the upper Magdalena River, which proceed to Girardot, where the goods are unloaded and placed on train. This train proceeds as far as Facatativa, where transfer is made from the yard-gauge railroad to the meter-gauge railroad of the plateau, which finally lands the goods in Bogota. All these conditions make careful packing indispensable. All goods and machinery should be packed in waterproofing because of the excessive humidity, the cases should be of medium size wherever possible, and full attention must be paid to Colombian customs regulations.

CARE IN THE EXECUTION OF ORDERS.

An important point is care in the execution of orders. Manufacturers in the United States do not always follow the instructions of the purchasers in reference to packing, customs declarations, etc., considering them of little importance. Shipments from England, France, and Germany are generally made in accordance with buyers' instructions, and this fact accounts, in part, for their popularity. This condition arises from the long experience of the European traders in the South American markets. They have studied the tastes and needs of those markets and do everything possible to meet the wishes of their clients. American commission houses generally are aware of these conditions, but as they only transmit the orders to the manufacturers it is believed that the latter are responsible for most of the errors in shipping—these mistakes arising through a failure to follow the instructions of the buyers.

SHIPPING DOCUMENTS.

All shipments must be accompanied by a consular invoice signed by a Colombian consul. The drawing up of these documents should be carefully studied and customs declarations made in accordance with the tariff. Importers usually give to the concerns taking the orders a true customs declaration in order to avoid the fines that incorrect declarations incur. Shipments should be made directly to the agents at the seaport, so that they may pass the goods through customs. Agents should receive copies of consular invoice and bill of lading.

American houses frequently send, with the goods and shipping papers, drafts against customer which must be met or accepted before the bank will release the goods. This system is claimed to be bad when the customer does not reside at the seaport. For instance, these documents and drafts are often sent to some Bogota bank and, as the mail takes 15 or 20 days to go from the coast to Bogota and back, the goods, in the meantime, are tied up in the customs paying storage.

The customs duties are according to gross weight, and when differently classified articles are included in one package the weight of the packing is prorated.

CREDITS.

Generally European houses allow credit of at least six months. If Colombian merchants could obtain the same terms from the United States this would be an important factor in increasing the business between the two countries. It is suggested that if the United States merchant can not grant easier terms it would appear to rest with the American banks to afford the necessary facilities in the way of discounting drafts, etc. These banks when collecting should grant easy terms, because in Colombia payments are not usually very punctual; this does not mean that the acceptance of the draft is not good, but there is considerable latitude in Colombia in the matter of paying drafts. The intermediaries do not care to assume responsibility, nor to take the trouble to protect the drafts, as the procedure is not so rapid or convenient as in other countries. Moreover, as the majority of the drafts that reach Colombia from manufacturers are small, the banker who collects has more work than a banker in another country and has to charge a higher commission.

Most of the importations into Bogota are on a credit basis, through the medium of commission houses, who draw on the customers at 120 or 160 days. American manufacturers, with some exceptions, do not care for this kind of business and usually demand payment against shipping documents in New York, which is not generally acceptable to the merchants of Colombia. The latter are required to place the money in New York at the time they order, and manufacturers sometimes delay months in filling the orders, with the result that the money loses interest in Colombia, where rates are high.

Of late large interests in Manchester, England, have been cutting down the time granted on sales in Colombia by giving only four months instead of six months and upward.

INSURANCE CLAIMS.

European houses give close attention to the matter of insurance claims for the account of the clients and take all necessary steps to secure payment, usually making no charge for the service. American houses have shown less interest in this matter. European insurance companies, it is reported, are far more liberal and prompt in settling claims. American houses have complained that insurance is too high, but this is on account of the fact that ocean freight, customs duties, and inland transportation are so high that at times the first cost of the goods is doubled, all of these elements having to be covered by insurance.

METHODS OF MAKING QUOTATIONS.

The merchants of Colombia are accustomed to have prices for machinery and merchandise quoted either f. o. b. or f. a. s. port of shipment, country of origin. Only in rare cases, where machinery-installation contracts provide for erection in place ready for operation, are prices quoted delivered. The principal reason for this has been the many changes in shipment necessary when materials are destined for the interior. Another section of this report (see p. 64) indicates the number of transshipments required in the case of consignments for Colombia. Still another section (p. 67) gives the freight rates to the interior; this will assist American exporters to give the prices of goods delivered to the interior.

EXAMPLE OF COMMISSION MERCHANTS' REGULATIONS.

One of the leading commission merchants and bankers of Colombia has promulgated the following regulations in regard to documents and procedure in the clearance of shipments entering and leaving Colombia, together with the fees charged for the service:

IMPORTATION.

Customers in Colombia should instruct shippers abroad that shipping documents, bill of lading, and consular invoice should be sent to the commission merchant in Colombia direct. This prevents delays and difficulties. The commission merchant in Colombia does not advance funds to pay customs dues. Customers should previously make a deposit in the national treasury to cover customs dues. When this is not done the commission merchant will clear the merchandise only when the customer remits or deposits at one of his agencies or furnishes sight drafts of first-class foreign exchange.

Customers should give their commission merchant special power of attorney to attend to all claims, etc., and especially to sign treasury documents for the custom dues. A sample copy of the power of attorney will be sent on request.

EXPORTATION.

The commission merchant undertakes to receive and ship merchandise for export. In the case of freight for the United States the commission merchant requires a special power of attorney, which is demanded by the American consul and which must be signed by the export house before a competent witness.

FOREIGN REPRESENTATIONS.

The commission merchant undertakes to represent foreign houses dealing in articles of ordinary consumption, according to special conditions, which must be stipulated in private contract.

TERMS.

Importation.—To pay freight and petty expenses importers should supply the commission merchant with funds in advance. If this is not done the commission merchant will draw on them at three days' sight in favor of the commission merchant's nearest agent, with a surcharge of 2 per cent.

When the commission merchant is supplied with funds in the nature of drafts on houses abroad a charge of one-half per cent is made for the indorsement.

The commission merchant makes a charge of $1 Colombian gold ($0.97 United States currency) for receiving and dispatching each ton of 1,000 kilos or 2 cubic meters of merchandise.

For materials for mines, bridges, railways. and machinery in general the commission merchant grants a concession of 50 per cent.

The minimum commission is $1 Colombian gold.

Exportation.—To pay freight and petty expenses the commission merchant will draw on the foreign consignee at three days' sight, for which the commission merchant must be expressly authorized by the shippers, sufficiently in advance.

No charge is made for receiving and shipping merchandise in general destined for export, except in the case of hats, when a charge of $0.50 Colombian gold is made for each case.

For gold bars, silver, and platinum a charge of one-sixteenth per cent ad valorem is made.

Sundry.—For purchase and sale of foreign exchange, 1 per cent.

For collecting bills of exchange, 1 per cent.

When it is necessary to refer the business to one of the commission merchant's agents, an additional charge of 1 per cent is made.

Minimum commission, $0.50 Colombian gold.

The commission due the commission merchant will be discounted from the value of the drafts sent the commission merchant; consequently when collection charges are for the account of the drawees they should be included in the amount of the draft.

For purchasing articles in Colombia or abroad from funds in hand, 5 per cent.

For selling goods in Colombia or abroad, 5 per cent.

For giving information, as exact as possible, on business people in the country, $5 Colombian gold.

For receiving passengers in Puerto Colombia, $5 Colombian gold.

INLAND FREIGHT RATES.[1]

The freight on 1 ton of machinery, building materials, and cement from Puerto Colombia or La Machina (Cartagena Wharf) to Bogota is as follows:

Via Barranquilla:

Railway freight, Puerto Colombia to Barranquilla, $3.63 United States gold plus 3 per cent	$3.74
Cartage in Barranquilla, customhouse to river port	.40
Loading and unloading	.80
River freight, Barranquilla to La Dorada, $14 less 10 per cent discount ($1.40)	12.60
Government river taxes	4.00
Total, Puerto Colombia to La Dorada, per ton	21.54

Via Cartagena:

Railway freight, La Machina to Calamar	5.00
River freight, Calamar to La Dorada, $12.75 less 10 per cent discount ($1.27)	11.48
Loading and unloading	.80
Government river taxes	4.00
Total, La Machina to La Dorada, per ton	21.28

In Barranquilla all agents charge a commission of from 50 cents to $1 for handling each ton or cargo. In Cartagena Pineda Lopez & Co. give this service free of charge.

La Dorada to Bogota:

Freight on machinery and building materials	$33.00
Municipal tax	4.00
Total	37.00
Freight on cement	21.50
Municipal tax	4.00
Total	25.50

Each shipment has an additional charge of $0.14 for stamp duty.

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[1] The costs given in this section, with the exception of the freight items from Puerto Colombia to Barranquilla, are in legal gold of Colombia. The exchange rate at the time this report was prepared was $1.06—that is, 1 Colombian dollar was equal to $0.943 United States currency.

Packages measuring more than one-half cubic meter (17.66 cubic feet) will pay freight by weight or by measure at the option of the transportation companies.

Additional charges on the river boats are as follows:

Dynamite and similar materials pay 200 per cent above the regular freight.

Powder, inflammable materials, or corrosives, gasoline, carbide of calcium, fuse for mines impregnated with inflammable substances, and acids when they may be corrosive or inflammable (except inoffensive acids such as boric, stearic, etc.) pay 100 per cent above the regular freight.

Oil of turpentine, alcohol, and caustic soda, when not packed in iron drums in good state, pay 50 per cent above the regular freight.

Large pieces that weigh 500 kilos (1,102 pounds) or measure 1 cubic meter (35.3 cubic feet) and do not exceed 1,999 kilos (4,405.8 pounds) or 3,999 decimeters (141.16 cubic feet) and automobiles in boxes, whatever their weight or volume, pay $5 per ton regular freight.

Large pieces that weigh 2,000 kilos (4,408 pounds) or measure 4 cubic meters (141.26 cubic feet) and do not exceed 4,999 kilos (11,020.8 pounds) or 9,999 decimeters (353 cubic feet) pay $10 per ton regular freight.

Large pieces that weigh 5,000 kilos (11,023 pounds) or measure 10 cubic meters (353.14 cubic feet) and do not exceed 7,999 kilos (17,634.6 pounds) or 15,999 decimeters (564.8 cubic feet) pay $15 per ton regular freight.

All of the above special items also incur extra charge on the railways in accordance with their weight or bulk.

The freight on 1 ton (1,000 kilos, or 2,204.6 pounds) of machinery, building materials, and cement from Puerto Colombia or La Machina (Cartagena Wharf) to Medellin is as follows:

Via Barranquilla:	
Railway freight, Puerto Colombia to Barranquilla, $3.63 United States gold plus 3 per cent	$3.74
Cartage in Barranquilla, customhouse to river port	.40
Loading and unloading	.80
River freight, Barranquilla to Puerto Berrio, $12.50, less 10 per cent discount ($1.25)	11.25
Government river taxes	4.00
Total, Puerto Colombia to Puerto Berrio	20.19
Via Cartagena:	
Railway freight, La Machina to Calamar	5.00
River freight, Calamar to Puerto Berrio, $11.25, less 10 per cent discount ($1.12)	10.13
Loading and unloading	.80
Government river taxes	4.00
Total, La Machina to Puerto Berrio	19.93
Puerto Berrio to Medellin:	
Railway freight, Puerto Berrio to Cisneros	10.19
Road freight, Cisneros to Botero (average)	16.00
Railway freight, Botero to Medellin	4.80
Cartage in Medellin	.80
Municipal tax in Medellin	12.00
Commission agents at Puerto Berrio, Cisneros, Botero, and Medellin	2.00
Total, Puerto Berrio to Medellin	45.79

Each shipment has an additional charge of $0.20 for stamp duty.

Packages pay freight by weight or by measure at the option of the transportation companies.

BANKING BUSINESS.

There are few banking laws in Colombia, and banks are governed to-day by the law of limited companies contained in certain chapters of the Commercial Code, with amendments thereto and legislative decrees of 1906.

Banks are not allowed to issue bills at present, but it is probable that laws will be passed authorizing them to issue bills under Government supervision.

Mortgage banks are governed by a law which will probably not be changed, as it is very liberal.

Public men familiar with the subject suggest that there is need of a bank in the capital of the Republic with a capital of not less than $15,000,000, as the country is developing and there is very little money in circulation. According to statistics there is not more than $20,000,000 in circulation in the country, including paper, silver, nickel, and foreign gold. This is hardly sufficient for Bogota, Medellin, Cucuta, and Barranquilla. To this shortage of money may be attributed (in part, at least) the backwardness of Colombia in the development of agriculture and cattle raising, which should constitute the principal wealth of the nation. With a bank of large capital possessing branches and agencies in the principal towns, the country's industries would increase enormously; on the Pacific side, where the land is very fertile, great sugar plantations might be established, and on the Atlantic side there might be millions of head of cattle, with packing houses, on the vast plains of that region.

It is suggested that a large bank properly guaranteed might become an administrator of the nation's finances and obtain the power to issue bills.

The following figures show how favorable the banking business is in Colombia:

Banco de Colombia.—Capital, $840,000, all paid; reserve fund, $16,000; contingency fund, $4,163; profits last half of 1916, $93,846.

Banco de Bogota.—Capital, $500,000, all paid; reserve fund, $180,000; contingency fund, $4,205; profits last half of 1916, $77,004.

Banco Central.—Capital, $1,432,227, all paid; reserve fund, $370,395; contingency fund, $809,975; profits last half of 1916, $104,068.

Banco Hipotecario de Colombia.—Capital, $500,000, all paid; reserve fund, $45,500; contingency fund, $18,500; profits last half of 1916. $69,401. This bank engages only in mortgage business.

It may be seen that in spite of their small capital and the European war the banks are doing well.

METHODS OF ACQUIRING LAND.

There are three methods by which land may be acquired in the Republic of Colombia, as follows:

(1*a*) By purchase, outright, of privately owned lands, with taxes paid to date. These properties generally carry with them hereditary titles, guaranteed by the Government of Colombia, under both Federal and State laws, and can be considered safe investments.

(1*b*) By purchase, outright, of privately owned lands which have been transferred by public sale under direction of the Government. These lands include all those properties sold by the Government for nonpayment of taxes, as well as those confiscated.

(2) Through the granting of public lands by Government concession for certain terms of years and under restricted conditions, such as the exclusion of salt, emeralds, oil, quinine, rubber, and all other substances that may not become adjudicative by the Government. The rule with reference to the exclusion of other substances is more or less flexible and arbitrary. For this reason the concession method can not be considered desirable, although land is easily acquired in this manner.

(3) By the application of what is known as "Waste-land certificates," representing various grants of land. These certificates were issued by the Government of Colombia, from time to time, in payment and recognition of military services; and also by the government of the New Granada Confederation for military services and monetary consideration. Both classes of such certificates will be honored by the Government of Colombia, whenever presented, and may be considered safe and sound purchases. These certificates may be bought directly from the holders or from brokers in Bogota, Medellin, and Barranquilla. They fluctuate in value, according to demand, the market price varying from 6 cents to 10 cents per acre. The operation of applying waste-land certificates consists in the location and denouncement of suitable public lands, the purchase of sufficient certificates to cover the area of such lands, the ejection of squatters, if any, from the lands, the survey of the lands by an official Government surveyor, and the surrender and recording of the waste-land certificates with the minister of public works. Upon the completion of these requirements the Government of Colombia will issue a full title, which becomes at once effective and defendable. Such titles are transferable. The Government will also certify as to the validity of waste-land certificates, whenever this is necessary, and issue an official certificate, in accordance with law, to bearer.

REGULATIONS REGARDING EXECUTION OF DOCUMENTS.

Articles of incorporation and by-laws regulating acts of the corporation must be attested by a notary public or other officer having a seal and be filed with the minister of the interior in Colombia. These articles and by-laws must have the certificate of the notary attested by the secretary of state of the State granting the notary's commission; the Secretary of State of the United States must certify to the signature and seal of the secretary of state of the State; a Colombian diplomatic or consular officer must certify to the signature and seal of the Secretary of State of the United States; these documents must then be certified, translated, and protocolized by the minister of foreign relations and then filed with the minister of the interior in Colombia.

Titles to real estate require the presence before the Colombian notary of both the seller and the buyer, the latter having to accept the sale and sign the acceptance in the deed. Both may be present either in person or by attorney in fact with power attached.

Powers of attorney made in the United States for use in Colombia must be attested before a notary or other officer having a seal, his certificate and power being attested by the secretary of state of the State and this certificate attested by the Secretary of State of the United States. A Colombian diplomatic or consular officer must then attest the signature and seal of the United States Secretary of State, when the power of attorney must be sent to Bogota for translation and registration with the minister of foreign relations. Documents may be sent to the American legation for such registration.

The charges for such registration in the case of one power of attorney sent through the consulate at Barranquilla amounted to $22.80, as follows: Certification, $3; paper, $1.40; stamps, $6.40; official translation, $11; other charges, $1.

TRADE-MARK PROTECTION.

The subject of the registration and protection of trade-marks and trade names in Colombia is comprehensively covered by law No. 110 of 1914. This law is similar in scope to those of the other countries of South America, but its provisions are in general more liberal. Use is recognized as the basis of ownership in a mark, and while registration is prerequisite to the enforcement of the legal rights granted, any one who has publicly used the mark within five years may oppose its registration by another or apply for cancellation of registration if already granted. Commercial or trade names are to be accorded full protection without the necessity of registration.

Three different classes of marks are provided for—commercial, agricultural, and manufacturers' or trade-marks. It is unnecessary to register the same mark in all of these classes, however, as the law prohibits the registration in one class of a mark that has already been registered in one of the other classes.

In applying for registration of a trade-mark it is necessary to present a power of attorney legalized by a Colombian consul, at least three copies of the mark, each bearing a 20-cent stamp, an electrotype not over 12 by 12 centimeters (4.72 inches square), a description of the mark, and a statement of the products on which it is to be used, the place of manufacture, and the name and address of the applicant. A receipt must also be presented, proving the payment of the prescribed registration fee of $15. No investigation is made to determine the right to register a mark, but the application must be published three times in the Official Gazette at an expense to the applicant of $2.50. Unless opposition is presented registration is granted after 60 days, and a notice to that effect must then be published, the cost being $3. Registration is valid for a period of 20 years and may be renewed upon payment of a renewal fee of $30.

Heavy penalties, including both fines and imprisonment, may be imposed for imitating or otherwise infringing registered trade-marks. In addition to the provisions regarding the protection of trade-marks and commercial names, the law contains a general prohibition against unfair competition, which is defined as any act done in bad faith for the purpose of causing confusion between the products of two manufacturers, dealers, or agriculturists, or for the purpose of discrediting a competing establishment, even though confusion does not result.

[A list of attorneys engaged in the registration of trade-marks in Colombia is on file in the Bureau of Foreign and Domestic Commerce and will be furnished to interested persons upon request.]

MISCELLANEOUS CONDITIONS AND REQUIREMENTS.

Postage to Colombia must be fully prepaid at the rate of 5 cents per half ounce for letters; the parcel-post rate is 12 cents per pound or fraction thereof, parcels not to exceed 2 feet in length, 4 feet in girth, or 11 pounds in weight.

The shipper must send commercial invoice in duplicate to consignee for clearance purposes.

Small unsalable samples up to 25 kilos (55.12 pounds) are free of duty. Passengers arriving in the country are allowed 150 kilos (330.6 pounds) of personal effects free of duty if brought as baggage. Commercial travelers must pay duty on samples of value, of which 75 per cent will be returned on reexportation. No general Government license fee is charged commercial travelers.[1]

Consular invoices should accompany all shipments of freight to Colombia; they should also accompany samples, even when brought as baggage. To avoid customs fines, commercial invoices should accompany all packages when sent by parcel post. Invoices must arrive in the hands of the consignee or his agent by the steamer bringing the freight, as the customhouse manifest must be presented 24 hours after the merchandise reaches the customhouse. If the merchandise is consigned subject to acceptance or payment of draft, the consignor can be protected only if consignment be made to the bank through which the draft is passed, with directions to indorse invoice to importer on compliance with instructions. Information concerning the financial standing of commercial houses may be obtained through the local banks. Correspondence should be in Spanish.

Customs duties are specific in Colombia and cover gross weights of packing and packages.

The standard of weights and measures is the metric.

Passengers embarking for Colombia must have passports viséed by Colombian consul at port of embarkation. All American travelers should obtain an American passport from the Department of State at Washington before leaving the United States.

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[1] Some cities have a municipal tax, the traveler being required to obtain a license at the time of showing his samples. The rates and the cities requiring licenses are given in Tariff Series No. 35, published in 1916 by the Bureau of Foreign and Domestic Commerce.

V. SUMMARY.

Colombia has extensive natural deposits of earth and rock materials from which there are now manufactured the basic masonry requisites generally known as clay products and cementing materials. In quality and finish most of these do not compare with similar products produced in the United States or European countries. The materials manufactured, however, possess sufficient resistance for the ordinary constructions now being carried out in the several cities of the country. The articles produced include common brick, roofing tiles and sewer pipe, common and hydraulic lime, and Portland cement. Small quantities of other clay products, such as sanitary fixtures and wall tiling, are produced in Bogota and Medellin. The quality of these, however, is not equal to that of foreign products. In the interior, and to some extent in the coast cities, such materials are finding a market. The samples of clay tiling manufactured at Caldas will bear inspection and study. The clays found in the coal measures of Cundinamarca and Antioquia are of excellent quality for the manufacture of fire bricks, and the bricks now made in a more or less crude way from the available materials are of superior quality.

Portland cement made in the country is for the most part of indifferent quality, and the quantities produced at present are far from sufficient to supply the demand. The high cost of inland freight influences the consumption to no small degree. There are reported to be sufficient quantities of raw materials in Colombia for the establishment of a modern up-to-date Portland cement mill. The market is unquestioned.

Most of the steel products entering Colombia are used for fencing, railroad work, and roofing and siding. The quantity of steel used for building work aside from the roofing and siding is very small. The United States furnishes the greater part of the steel consumed, and the market is limited only by the high cost of the ocean and inland freights, together with the present unusually high base prices of the product f. o. b. New York. The country has iron ore and coking coal that could be utilized for steel making. Some years ago an effort to make wrought iron met with temporary success. Lack of capital and indifferent management were responsible for the abandonment of the enterprise. The making of steel at the old iron works, or at least on one other property near Bogota, would be possible if enterprise and capital were enlisted. The production of commercial mild steel in Colombia would assist greatly in the development of the country and open up many avenues of industry that are now closed on account of the prohibitive prices of this common commodity.

The explosives used are imported from the United Kingdom, the Continent of Europe, and the United States. The larger part of the imports in 1915 originated in the United States. There are in Colombia active native representatives of the European explosive manufacturers who admit that they are now depending on the United States for their supplies, and it is reasonable to believe that they will return to their former sources of supply after the war unless American manufacturers can offer equal or better inducements.

Architectural terra cotta is not used on account of the simplicity of the construction in the cities. As the country develops and transportation is improved, with a resulting demand for better and higher buildings, there should be a market for this material. The private owners invariably look for low first cost and use artificial ornamental stone made locally or cast in place on the building.

Hydraulic floor tiles ("mosaicos") are used in the principal cities. Their cost, especially in the coast cities, is such as to make competition by ceramic products difficult. Architects are favorably disposed toward the finer products coming from the United States and have employed such materials to a relatively small extent.

Special roofing materials, such as asbestos shingles, composition and ready roofings, and metal shingles, have been used only in special cases. The most common roofing used in Colombia is the clay tile made in the country. This has been used not only on ordinary dwellings but on the pretentious civil constructions of the Government. The only foreign material that has displaced the homemade tiles to any appreciable extent is the corrugated sheet steel, plain and galvanized. This material is rather extensively employed in industrial and dwelling work.

Plumbing fixtures and supplies are being used more and more by those who can afford to purchase them, and there is a good market for nickel-plated piping, washstands, and toilets. Bathtubs are not used extensively in the warmer climates, the people preferring shower baths. In the higher altitudes, where warm water is almost a necessity, the open bathtubs are used to a greater extent.

Millwork and ornamental ironwork is generally made in the country by the native workmen, who possess sufficient skill to produce finished work of fair quality, which answers the purpose. There is, therefore, only a small market for these materials.

At present the largest part of the imports of window glass, linseed oil, paint, and hardware come from the United States. Formerly this trade was largely controlled by the United Kingdom and Europe. The American manufacturers, in order to hold this trade that has been obtained as a result of the war, should make an effort to duplicate the qualities of the materials furnished by Europeans and should follow their methods of packing.

Colombia needs banks with larger capital than those now established, highways to connect the Department capitals, railroads and tunnels to connect and complete the railroads now existing, immigration and foreign capital to assist in carrying out the work, and capable men for the subsequent operation of the railroad properties. With the completion of the railroads of the country and the placing of the interior cities within two or three days of the coast, there would come the development of vast tracts of land along the railroads, as well as the opening up of mines which to-day can not be developed on account of the lack of these means of communication. The growth of the country is checked by the want of men and money.

NOTE.—In connection with the foregoing report, Special Agent Ewing submitted a list of firms and individuals in Colombia whose business is related, in one way or another, to the market for construction materials and machinery. Interested persons may obtain this list from the Bureau of Foreign and Domestic Commerce or its district or cooperative offices by referring to file No. 1311.

RECENT PUBLICATIONS ON CONSTRUCTION MATERIALS AND MACHINERY.

The Bureau of Foreign and Domestic Commerce has recently issued the following monographs by Special Agent Ewing, which may be obtained for the stated prices from the district offices of the Bureau or from the Superintendent of Documents, Government Printing Office, Washington, D. C.

Markets for Construction Materials and Machinery in Cuba. Special agents series No. 139; 61 pages; price, 10 cents.

Markets for Construction Materials and Machinery in Venezuela. Special agents series No. 144; 57 pages; price, 10 cents.

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DEPARTMENT OF COMMERCE
BUREAU OF FOREIGN AND DOMESTIC COMMERCE
B. S. CUTLER, Chief

SPECIAL AGENTS SERIES—No. 161

SHOE AND LEATHER TRADE IN THE PHILIPPINE ISLANDS

BY

C. E. BOSWORTH
Commercial Agent

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LETTER OF SUBMITTAL.

Department of Commerce,
Bureau of Foreign and Domestic Commerce,
Washington, December 18, 1917.

Sir: Submitted herewith is a report on the shoe and leather trade of the Philippine Islands, made by Commercial Agent C. E. Bosworth after a visit to the islands and study of the market. This is the third report by Mr. Bosworth giving results of his investigation of markets for American shoes and supplies for the leather-manufacturing industries, the two preceding reports relating to New Zealand and Australia. The report herewith contains, besides a review of the boot and shoe trade, discussion of the domestic manufacture of footwear and harness, the production of hides and skins, the tanning industry, and supplies of native tanbarks.

Respectfully,

B. S. Cutler,
Chief of Bureau.

To Hon. William C. Redfield,
Secretary of Commerce.

SHOE AND LEATHER TRADE IN THE PHILIPPINE ISLANDS.

INTRODUCTION.

The Philippines are a group of tropical islands, over 3,000 in number, with a total area of about 115,000 square miles. Beginning at approximately 4.5° north latitude, they extend northward over about 16.5 degrees, between 116° and 127° east longitude. The Pacific Ocean is on the east and the China Sea on the west. The total length of the group is over 1,500 miles and the width nearly 700 miles. The nearest port on the United States mainland is San Francisco, 6,585 miles to the east; Hongkong is 628 miles west and Nagasaki 1,465 miles northwest. While some 400 of the islands are inhabited, the most important are Luzon, whose principal city is Manila, with 40,000 square miles, and Mindanao, whose principal city is Zamboanga, with 36,000 square miles. These two islands embrace about two-thirds of the total area of the group.

GEOGRAPHIC FEATURES AND CLIMATE.

The general character of the islands is mountainous, but Luzon and Mindanao, unlike most islands in the western Pacific, have considerable areas of level land well adapted to grazing. The rivers are numerous; the vegetation is tropical and luxuriant.

Being entirely within the Tropics, the islands have typical tropical weather, except that the nights are usually cool. There are but two seasons, the wet and dry. The rainy season extends from June to October and the dry season from November to May. The word "dry" should not be taken too literally, however, for there is seldom a month without at least a little rain. The mean annual rainfall in Manila is 76 inches.

POPULATION AND CHARACTER OF INHABITANTS.

The total population is estimated at 8,830,000, some 7,730,000 of whom belong to Christian tribes. The majority of the people are Roman Catholics, but practically every Protestant denomination is represented. About 275,000 are Mohammedans and the rest are divided among a dozen pagan tribes.

Practically all of the natives are of the Malay race. They are rather small in stature, have clearly cut features and straight hair, and straight noses are quite common. There are innumerable tribes and dialects, but in contrast to former conditions, all are living peacefully since coming under American influence. There are many Chinese and Japanese and some people from the Dutch East Indies, India, and other parts of the Orient. Of the Caucasians, the Americans are the most numerous. A few Spaniards remain, and there are representatives of every European nation of commercial importance.

Education is becoming more general and more sought for, and with it a taste for Western manners, dress, and customs is developing. The average Filipino is courteous, fun loving, and clean. While the dress of the men is not wholly Western, when the younger generation "dresses up" it is in Western clothes. The men in particular have a passionate liking for fine footwear and expensive hats. The women certainly appreciate American footwear, but cling tenaciously to their peculiar dress.

DISTRIBUTION OF POPULATION.

The inhabitants are distributed throughout the islands in cities of considerable size and in large and small towns. The people may work in remote places during the day but they return to their city, town, or village homes at night. It is seldom that a lone farmhouse or other isolated dwelling is occupied by a civilized native family.

The principal islands and the approximate population of each are as follows: Luzon, on which is the city of Manila, 3,798,507; Panay, with the city of Iloilo, 743,646; Cebu, with the city of Cebu, 592,247; Mindanao, with the city of Zamboanga, 499,634; Negros, with the city of Dumaguete, 460,776; Leyte, with the city of Tacloban, 357,641; Bohol, with the city of Tagbilaran, 243,148; Samar, with the city of Catbalogan, 222,690.

Many of the municipalities are merely groups of formerly independent villages, now brought together under a single city or municipal government, so that a list of such municipalities would not properly be a list of the largest cities. Those compact enough to be of commercial importance are as follows: Manila, 235,000; Cebu, 65,000; Laoag, 43,000; Iloilo, 40,000; Albay, 40,000; Nueva Caceres, 40,000; Vigan, 38,000; and Zamboanga, 24,000.

INDUSTRIES AND RESOURCES.

The principal industry of the islands is agriculture, which furnishes employment for a very large part of the population. The principal crops are manila hemp, sugar, tobacco, rice, Indian corn, and coconuts. Grazing is considered a rather precarious business because of the rinderpest. Mining contributes a little over a million dollars worth of gold, iron, coal, and other mineral products.

The principal manufactures are cigars and cigarettes, alcohol, and distilled liquors. The modern manufacture of rope has now been successfully undertaken, and copra (coconut) is being converted into oil and soap. The making of embroidery is the chief occupation of the women.

The forests are of great extent and contain valuable growths of hardwood and other timber. These resources are carefully conserved and economically worked under Government supervision.

Wages in the Philippines are not high, but are sufficient to keep the natives comfortable and happy. There is some kind of employment for all who care to work. Earnings range from $10 to $20 per month for ordinary labor.

BANKING AND CURRENCY.

The Philippine Islands have a currency of their own. It consists of paper and silver, maintained at par by a reserve of United States gold. The Philippine peso is worth $0.50 United States currency.

The International Banking Corporation has a local branch at 15–21 Plaza Moraga, Manila. This bank also has a branch in Cebu and agencies throughout the islands. The head office is in New York City.

The Hongkong and Shanghai Banking Corporation maintains an agency at 55 Calle Anloague, Manila, a subagency in Iloilo, and local agents in Cebu. The head office is in Hongkong.

The Chartered Bank of India, Australia, and China has an agency at 34 Plaza Cervantes, Manila. There are subagencies in Cebu and Iloilo and local agents in Zamboanga. The head office is in London.

The Bank of the Philippine Islands, with head office at 16 Plaza Cervantes, Manila, has branches in Zamboanga and Iloilo.

TRANSPORTATION, COMMUNICATION, AND BUSINESS FACILITIES.

Chambers of commerce and boards of trade are active in all the cities and chief towns. Perhaps the most important is the Manila Merchants' Association. The work of this organization includes more activities than any of the others.

The Interisland Express Co. has offices throughout the islands and works in conjunction with American and European express companies.

The Postal Department is entirely independent of the department in the United States, but it undertakes the same services. These services are eminently satisfactory, except, of course, the difficulties of transportation make some branches of it slower than in the United States.

About 600 miles of railways are operated between Manila and the important cities and towns on the island of Luzon and give very good service. These lines belong to the Manila Railway Co. There are other short lines running out of Iloilo and Cebu, owned by the Philippine Railway Co. Trolley lines are in operation in Manila and Cebu. The system in Manila is comprehensive and affords good service in the city and to the suburbs.

Telegraph lines are owned and operated by the Government. There are offices in some 250 villages and towns, usually located in the same building with the post office. The cable lines, under private ownership, connect the principal islands and give communication with the United States and other countries. The companies operating the cables are the Commercial Pacific Cable Co. and the Eastern Extension Australasia & China Telegraph Co. Telephone service has been installed in the principal cities and in some of the Provinces.

Steamship lines maintain an adequate service between the various islands. Many of the boats are well appointed and of good size. Their cargo capacity and service is very satisfactory. Trans-Pacific lines are numerous and operate between America, the Philippines, the Orient, and Europe.

The official weights and measures of the islands are those of the metric system.

FOREIGN COMMERCE.

The total foreign trade of the islands for 1916 was $115,433,520, made up of imports valued at $45,496,337 and exports valued at $69,937,183. The principal imports are cotton manufactures, rice, iron and steel, oils, flour, chemicals and drugs, automobiles, coal, meat products, and manufactures of leather. The principal exports are hemp, copra, sugar, and tobacco.

More than half of the foreign trade is with the United States. In 1916 the United States furnished the Philippines goods valued at $22,862,673; French East Indies ranked second with $6,405,521; Japan third with $4,719,687; China fourth with $2,643,378; and the United Kingdom sixth with a slightly less amount. Of the exports of Philippine products the United States took $35,648,132 worth; the United Kingdom took the second largest amount, $12,434,261; and Japan ranked next with goods valued at $4,848,807. Other exported products went in considerably smaller quantities to Hongkong, France, Spain, China, British East Indies, Canada, Australasia, Netherlands, and Italy.

MARKET FOR BOOTS AND SHOES.

The Philippines offer for boots and shoes a market of constantly increasing importance. In 1913 the footwear imports amounted to $684,967, but during the next three years these imports increased by $296,247 and gave in 1916 a total of $981,214. On account of the great increase in the price of footwear, it is expected that imports will show a temporary decrease, but as a rule the demand for modern footwear will increase with the maturing of the younger generation and the general trend of the people toward Western dress.

While there are several thousand white people in the islands, their trade is not the most important, for the natives, both men and women, "dress up" in American-style footwear, and those who are financially able have adopted modern footwear for regular wear. The men have a passionate liking for expensive hats and fine footwear and take readily to Western dress. The women cling closely to their native styles of dress but commonly wear American-style footwear.

POPULARITY OF AMERICAN FOOTWEAR.

American footwear is exceptionally popular, so popular, in fact, that the local shoemakers and manufacturers have always featured the use of American materials in their products.

The natives do not always use good judgment in their purchase of footwear. It is customary for an employee to get from his employer a "chit" or order for shoes, which he presents to a retailer. The price of the shoes or the time it may take to pay off the debt makes little difference to the purchaser so long as he gets shoes to suit his fancy. In the Chinese stores it is a common practice to plead lack of proper size or some other deficiency in stock until the Filipino customer offers a peso ($0.50) or two more than the regular price.

REQUIREMENTS IN MEN'S SHOES.

In shoes for ordinary wear the principal demand is for low shoes of medium and light weight. A few high shoes of the same general nature are also required. On account of the custom of wearing white socks, shoes for the islands should be made with either stainless or white linings. In general, the styles are from two to three years behind those in America. The Filipinos are especially partial to high heels and arches, and until recently the "rhino" toes appealed to them strongly, but with the change of style in America they have come to accept the medium high, round toes, although shoes with considerable side swing and toes high on the inside are selling well.

The principal materials demanded are calf, black, boarded; light, bright tan, also boarded; patent leather; some glazed kid in both tan and black; and a great quantity of canvas. The humid climate, which is so destructive to leather, the high prices of leather footwear, and the coolness of canvas have combined to increase the sale of the latter class of footwear out of proportion to the increases in the sale of all other classes. This increasing sale applies to both leather and rubber-fiber soled canvas shoes, and also to tennis shoes. Although far more expensive, tennis shoes have practically supplanted the Spanish alpargatas in the Philippine market. White leather shoes are also in fair demand.

While the men usually show good taste in the selection of their footwear, there is a demand for freak combinations of green leather with white canvas, patent leather in similar combinations, black vamps and white uppers with large black buttons, etc., but these styles are not at all representative of the market.

Sizes run from 4 to 9, in widths C, D, and E. Many of the men are fitted with youths' sizes. A popular price to retailers at the factory is $2.25 in normal times. For a shoe in the same grade they are now paying $3.75. A popular retail price is $4, but the men are now paying from $6 to $8. There are, of course, much cheaper and also much more expensive shoes sold. Some of the finest footwear made in America is sold in both the white and native stores.

REQUIREMENTS IN WOMEN'S SHOES.

The principal demand is for pumps of medium and light construction. Turn pumps are sold but do not dominate the market. Light welts and McKays are far more popular, especially the former. The favorite material is patent leather, with a good demand for black and tan boarded calf, rubber and leather soled canvas pumps; black, white, and some tan kid are also worn. Sizes range from 1½ to 6, in E and EE widths. A few C and D widths are carried in the high-grade stores.

A popular price at the factory of the United States Shoe Co. in Manila in ordinary times is $2.60, now $3.80. Retail prices most popular are $4 and $5 normally, but they now range as high as $10 and $12, though the majority of purchasers prefer shoes at $5 to $6.

There is, of course, some demand for high shoes, white and combination kid and calf, but very little demand for cloth other than canvas. As in men's shoes, the styles are, as a rule, two or three years behind America, but high Louis and Cuban-Louis heels are desired on nearly all women's footwear.

CHILDREN'S FOOTWEAR—SPECIALTY AND SPORT SHOES.

Children who went nearly naked as well as barefoot until a few years ago now wear American shoes. Nature-shape shoes are not much of a factor in the market. Shoes of ordinary shape and leather and barefoot sandals, with a big demand for tennis shoes, are the chief features of the market. The prices are about the same as for the cheap and medium grades in the United States. The sizes are graded: Boys', 2½ to 6; misses', 11½ to 2; children's, 8½ to 11; infants', 5½ to 8; and babies', 2 to 8.

There is very little demand for specialty and sport shoes. For outdoor games rubber-soled pumps and tennis shoes are nearly always sufficient. Specialty footwear, such as officers' riding boots and the like, are usually made to order.

IMPORTS OF BOOTS AND SHOES.

Imports of boots and shoes into the Philippines, according to countries of origin, during the last four years are shown in the following table:

Articles and countries of origin.	1913		1914		1915		1916	
	Pairs.	Value.	Pairs.	Value.	Pairs.	Value.	Pairs.	Value.
Cloth shoes:								
United States	4,351	$4,497	4,979	$5,538	38,619	$34,150	214,245	$168,471
United Kingdom	15	42			5	7	4	5
France			1	3				
Germany	11	11	4	3				
Italy								4
Spain	476,782	39,485	655,719	51,841	1,026,886	76,823	497,545	54,558
Switzerland	1	1						
China	50	22	8	13	205	78	5	5
British East Indies	112	79			61	53	11	8
Japan	1,053	183	530	114	83	9	1,179	175
Total	482,375	44,320	661,241	57,512	1,065,859	111,120	712,989	223,226
Leather shoes:								
United States	327,923	598,406	500,303	878,118	542,644	905,720	403,123	645,851
United Kingdom	533	608	190	428	282	530	280	455
Austria-Hungary	2	4	1	4				
Belgium	13	24	15	32				
Denmark	1	1						
France	214	492	106	212	117	430	48	58
Germany	882	586	675	319	3	4		
Italy	5	11	20	51	11	8		
Netherlands	16	42	13	16				
Spain	122,350	24,163	153,746	26,994	104,109	19,783	94,221	18,932
Switzerland	1	2	2	8				
Canada	6	3	1	5				
China	1,535	1,065	1,192	783	1,707	911	1,357	746
British East Indies	1,342	654	1,552	673	159	82	129	49
Dutch East Indies	40	21	80	48	2	1		
Japan	14,307	4,043	17,333	4,792	32,137	7,452	25,628	5,591
Turkey in Asia					4	6		
Australasia	11	22	102	286	7	21	10	30
Total	469,181	630,147	675,331	912,770	681,182	934,948	524,796	672,709
Rubber boots and shoes:								
United States	8,270	10,452	11,888	13,863	27,047	21,577	116,829	80,038
United Kingdom	32	20	3	3			7	3
Spain	2	2	1	3				
China	52	24			20	6	1	2
British East Indies							1	1
Japan	4	2	439	122	3,295	948	25,611	5,235
Total	8,360	10,500	12,331	13,991	30,389	22,530	142,449	85,279

METHODS OF WHOLESALING.

Shoes are wholesaled in the Philippine Islands through general importers, the shoe manufacturers who sell other lines in addition to their own, shoe wholesalers, and by direct representatives of large manufacturers in the United States, who sell noncompeting lines in addition to their own. These last-mentioned agents usually sell on commission and their territory includes a large part of the Orient.

For the manufacturer who has no Oriental representative stationed in the Philippines or within easy reach of them, the shoe manufacturers in Manila seem to offer the best selling connections, if the grades to be offered do not compete with their own. The second choice is the general importer or the shoe wholesaler. Finances and efficiency considered, the general importers may have a few points in their favor, but, of course, the shoe wholesalers are specialists.

Wholesalers usually figure their profits at 10 per cent. For commission agents, the compensation is usually 5 per cent. In dealing with wholesalers and the large retailers the terms are usually cash on presentation of shipping documents. The wholesalers have to offer very long credits, probably six months.

The Chinese merchants, who buy from the wholesalers and form an important part in the retail distribution, have a peculiar system of their own for both buying and paying. They like to visit the warehouse and spend hours in talking and looking over samples. When an agreement is reached, no order is signed nor does a confirmation follow by mail. The merchant simply says "finished" and the contract is made. Payments are made weekly and the sums paid amount to whatever the Chinese merchant is able to disburse at that time. If business during the week has been good, the payments are in proportion; if business has been poor, the payments are proportionately reduced. With the native retailers and white dealers, credits are a matter of the responsibility of the individual.

COMMERCIAL TRAVELERS.

Salesmen in the islands must speak Spanish and, of course, English. All Chinese and native merchants speak Spanish. Very few of the former speak English. The Spanish spoken is not Castilian, and is frequently interspersed with Tegalic or other native words, but a person with a knowledge of pure Spanish can get along very well. Unlimited patience is one of the prime requisites and courtesy is hardly less essential to success. Transportation is slow and the distances considerable. Living expenses are high. There is no special demand for entertainment.

RETAIL STORES.

There are a few, very few, exclusive shoe stores. The great bulk of the shoes reach the consumer through small general stores. Retailers figure their profits at from 35 to 50 per cent.

The window displays of the exclusive white-operated shoe stores are very modern and attractive. The displays of the other stores are a mixture of many things to the capacity of the window. The interiors of the stores are much like the windows. The service is prompt but unskilled. Many lines are usually represented in these small stocks and a complete range of sizes is seldom found in any one line.

Shoe findings of the same general nature as are carried in small stores in America are a part of the shoe department stocks in nearly all the stores selling footwear.

CUSTOMS REGULATIONS—TRADE-MARK PROTECTION.

The tariff act of October 3, 1913, established free trade between the United States and the Philippine Islands for the products of these countries. A through bill of lading is all that is required. A tariff of 10 to 25 per cent ad valorem is imposed upon leather and leather manufactures from other countries.

Registration of a trade-mark or trade name in the United States Patent Office affords the same protection against infringement in the Philippine Islands as in the United States. Local protection similar to that under the State laws in the United States is also obtainable by registration of such marks or names in the Division of Archives, Patents, Copyrights, and Trade-marks, of the Government of the Philippine Islands, Manila. Local registration, however, is not usually necessary but may be effective in preventing imitation within the islands. The fee for such registration is $25, and the period of protection is 30 years. Forms of application for registration under the insular law may be obtained by addressing the chief of the division referred to.

In order to prevent the importation into the Philippine Islands of goods bearing imitation marks, it is necessary to file with the insular collector of customs at Manila a statement of the name and address of the owner and of the place of manufacture, a certificate of local registration or of registration in the United States Patent Office, and seven copies of the mark. The various customs officials will then be instructed to exclude all goods bearing marks infringing the registered mark.

ADVERTISING.

Because of the many languages and the many publications, advertising in the Philippines is a somewhat complex problem. The dailies printed in English in the large cities reach much of the white population; those in Spanish and in some native tongue appeal to the Spanish speaking and reading portion. Most of these publications are, however, of comparatively small circulation. Because of the mixture of tongues, outdoor display is particularly adapted to this market. The plan and the cost of a campaign in the Philippines necessarily depends upon the classes to be reached and can best be arranged through the local representative. Catalogues should be in both Spanish and English.

SHOE MANUFACTURING.

Shoe manufacturing in the Philippine Islands is not of great commercial importance, but the industry shows a very satisfactory growth, and the product is far superior to what would naturally be expected in a country so little engaged in manufacture. It is probably the same temperament that prompts the Filipinos to produce their wonderful embroideries and other articles of skilled handicraft which influences their really successful attempts at shoemaking.

The local production is of two kinds: Homemade shoes, usually referred to as "Mariquinas," from the name of the district in which they are made, and the factory-made shoes, produced in the two American-operated factories in Manila. These shoes are all for men, no women's or children's footwear, except that of native design, being made in the islands. There are, of course, large quantities of sandal-like shoes made by the Chinese and Filipinos, but these are crude and made of locally tanned leather, having merely a forepart and flat sole; some consist of a bal strap of leather attached to a rather pretentious wooden sole, carrying a Louis-shaped wooden heel. Then there are grass shoes, Chinese shoes, and various forms of crude footwear adopted by the various tribes. The only kinds of interest to the American market, however, are the "Mariquinas" and the factory-made shoes.

PRODUCTION BY NATIVE SHOEMAKERS.

"Mariquinas" are made in the village of Mariquina, a few miles from Manila. There are many native shoemakers there who manufacture upon their own account and sell to the Chinese merchants, or who make shoes for these dealers from materials supplied by the dealers themselves. The uppers are usually cut, skived, folded by hand, and then stitched on a machine. This work is all done by the women with remarkable skill. The making is done by men working in the open space under the houses. The men usually finish three pairs in two days and receive 60 cents a pair for their work. The women receive from 75 cents to $1 for a dozen pairs of uppers. These wages vary a little with the kind of work undertaken.

The product of the makers who manufacture upon their own account wholesales at about $2.25 per pair, and some of their custom work, chiefly for Army officers, commands as much as $6 and $7 per pair. Some of these native shoemaking establishments turn out 60 pairs a day, though most of them produce a much smaller number. The upper leather is all imported and consists chiefly of tan and black calf, A, B, and C grades. The sole leather is native-tanned carabao or vaca hides.

FACTORY-MADE SHOES.

The factory shoes, in appearance and workmanship, compare favorably with similar grades produced in the United States. In quality of materials they are better. The styles are American, made over American lasts, and almost wholly of American leathers. In the cheaper grades some carabao and vaca soles of native tannage are used. The shoes are usually all leather, because the salvage of the sole-leather cuttings demands that they be cut into counters, box toes, etc. These two factories have a combined output of about 500 pairs a day, all men's welts.

Both factories are thoroughly modern in construction and equipment. The latter was imported from the United States. The operatives are mostly men and women who learned shoemaking in Mariquina and seem to thoroughly enjoy the factory work. Wages are about half what they are in the United States. Labor troubles are practically unknown.

These two factories are exporting a part of their output to the Dutch East Indies and the Orient, and this business is growing. The factory prices range from $4.25 to $5.15, according to the grade, and retail prices are $5 to $6.25.

IMPORTS OF LEATHER.

The quantity and value of leather imported into the Philippines during the last four years, together with the countries of origin, are given in the following table:

Articles and countries of origin.	1913		1914		1915		1916	
	Kilos.	Value.	Kilos.	Value.	Kilos.	Value.	Kilos.	Value.
Sole leather:								
United States	114,064	$99,764	180,252	$167,636	74,149	$67,118	103,142	$95,729
United Kingdom	43	53	481	502	28	41	17	52
France	90	101						
Spain	1,065	1,127						
Switzerland			1	1				
China	172	156	388	572	202	138	47	48
Dutch East Indies							57	70
Japan			488	602	358	478	402	497
Turkey in Asia	48	38						
Australasia	304	256	378	447				
Total	115,786	101,495	181,988	169,760	74,737	67,775	103,665	96,396
Upper leather:								
United States		110,836		145,271		126,204		156,523
United Kingdom		403		107		373		1,155
France		4						
Germany		685		360				
Italy				168				
Spain		8,327		13,327		10,441		5,923
China		74		10		48		56
British East Indies				9				40
Dutch East Indies								11
Japan		243				110		73
Turkey in Asia		46						
Australasia								837
Total		120,618		159,252		137,176		164,618
All other leather:								
United States		4,785		3,068		2,789		4,382
United Kingdom		1,182		2,875		2,031		1,431
Belgium				30				
France		61		251				93
Germany		153		215		2		
Netherlands		21						
Spain		119		1,599		169		44
China		36						82
British East Indies						15		
Japan				5		4		47
Australasia				4				
Total		6,357		8,047		5,010		6,079

HARNESS AND SADDLERY.

In proportion to the population, the Philippine Islands are large consumers of harness and saddlery. While motor cars and motor trucks are fairly numerous, they have not supplanted horse-drawn vehicles to the same extent as in other countries dominated by Caucasians. Large numbers of two-wheeled carriages of Spanish types

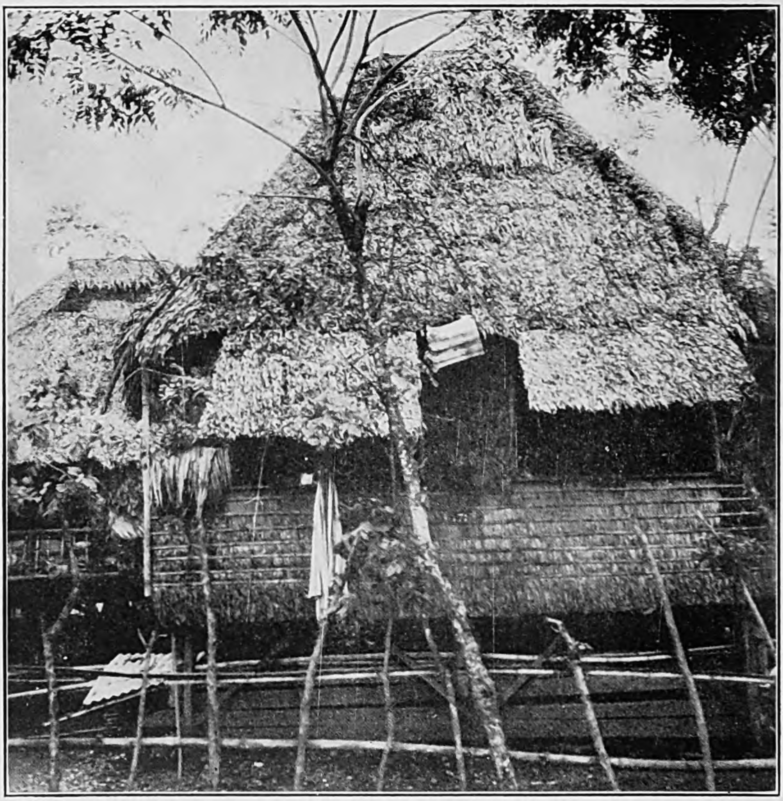

FIG. 3.—NATIVE SHOE FACTORY AT MARIQUINA.

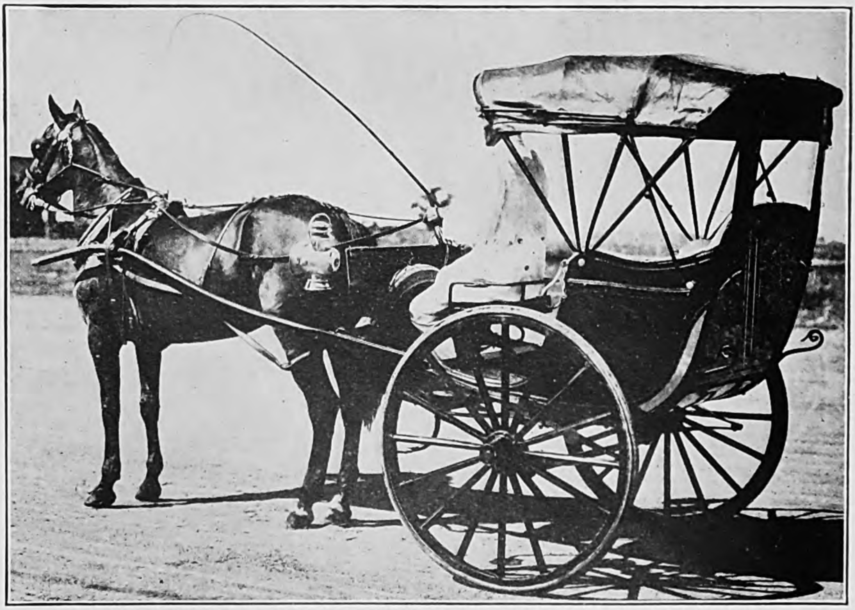

FIG. 4.—CALESA HARNESS, A TYPE MUCH USED IN THE PHILIPPINES.

and victorias are still used for pleasure and as public conveyances. Heavy hauling is done very largely by two-wheeled carabao carts, so that the demand for heavy team and truck harness is not as great proportionately as in some other countries. There are, however, large numbers of two-wheeled delivery carts in use in all parts of the islands. Horses are not numerous; most of the draft work to wagons is done by ponies. On the plantations mules and horses are, of course, used in addition to the carabaos.

The demand for manufactured harness from other countries is not large, however, for the local production pretty well satisfies the demand. Harness is made both by American firms and by native harness makers. The latter buy their supplies, except leather, from the American makers. Riding saddles are mostly imported from the United States and enjoy a good sale.

MARKET FOR AMERICAN MATERIALS.

The value of the imports of harness and saddles in 1916 amounted to only $5,250. The majority came from the United States. The next largest amount came from Japan, the latter country having assumed the second position, formerly held by the United Kingdom. The import of harness-making materials is really of considerably greater importance, but segregated figures are not available. Particulars as to individual items are given in the following paragraphs.

Harness is almost entirely of local manufacture; individual requirements are sometimes filled through mail-order houses in America. The chief demand is for small, stout harness for ponies, retailing at $20 to $25 per set. On account of the climate, leather deteriorates quickly. Web harness, because of its cheapness, might find a ready sale.

Collars are nearly all locally made and range in size from 15 to 18 inches for ponies. A few are required as large as 19 and 20 inches, but these sizes are exceptional.

Collar pads are usually of plain felt and locally made, but few are used. The natives commonly use a strip of palm as a protector.

Saddles are imported from America. The styles in demand include English cut-back saddles, park, stock, leather and carpet sidesaddles, and McClellan saddles. The latter are usually locally made over trees imported from America. The stock saddles are largely used in the mountains because of the double cinches. The heavier types of these saddles are not used at all. Prices on all saddles range about the same as in the United States.

Saddle girths of hair, cotton, and web are all imported. Some web girths are made up locally from imported web.

Stirrups of wood, both open and leather covered, and of XC and nickel plate are imported.

Riding spurs of all types, except the extreme weights, and rowels are imported from America.

Saddle blankets are practically all locally made from plain felt. A special pad to protect the animal's back when sweating excessively might find a limited sale, but as a rule very little money is expended for extras to assure comfort to the animals.

Riding bridles are imported to some extent.

Hames are imported. The importations include metal buggy hames, brass and nickel, and a very few XC plated; heavy hames are the usual type of wood hames, both plain and with brass or XC tops. The majority are plain hook hames without decorations.

Metal ware includes screw cockeyes, chain traces, rein chains, spreader chains, curb chains, swivel and plain bolt snaps, swivel trace snaps, screw choke strap snaps, breast strap roller snaps, and all standard buckles; also rings and dees, metal loops and spots, western bridges (locally called "footman's loops"), gag swivels and chains, metal harness trees, plain tree hooks and terrets, plain brass or nickel rosettes with a very few initial rosettes, and all kinds of harness rivets and nails.

Webbing is all imported from America.

Felt in full rolls and in standard weights and colors comes from America.

Dressings and similar preparations are all imported from America.

Leather is imported only for finest work. Locally tanned leather which the harness maker dresses himself is most generally used.

Clippers are of the hand variety only and are all imported, usually from America. No machine clippers are used.

Tools and machines are of the usual kinds and imported from America.

Whips are mostly thread and cane, plain, ferruled, and rubber lined in a variety of standard lengths. Steel-lined whips are too expensive for the Philippine market.

IMPORTS OF HARNESS AND SADDLES.

The following table shows the value and countries of origin of the imports of harness and saddles during the last four years:

Countries.	1913	1914	1915	1916
United States	$54,655	$101,449	$9,163	$3,601
United Kingdom	1,558	1,890	1,183	....
Belgium	138	....	....	....
France	300	....	....	....
Germany	7	....	....	....
Netherlands	18	....	....	....
Spain	41	15	296	9
China	4	11	....	28
Japan	464	716	1,171	1,611
Australasia	....	30	....	....
Total	57,405	104,111	11,614	5,250

HIDES AND SKINS.

Animals of any importance that are at all common in a wild state are boar, some small deer, and two or three kinds of wild buffalo. Perhaps the most important domesticated animal is the carabao, a species of buffalo, which is the principal beast of burden in the islands. Its hide is of great thickness and tensile strength. The slaughter of these animals is prohibited because of their indispensability to both commerce and agriculture. Only the worn-out or injured animals are allowed to be killed, but with nearly a million and a quarter of them in the islands, a considerable number of carabao hides find their way to market, though the supply is, of course, erratic. Carabao hides range in weight from 28 to 100 pounds.

CATTLE AND HORSE HIDES.

Next in importance as hide-producing animals are the cattle. These are mostly native cattle, called vacas, and are a mixture of Spanish and Indian cattle. All of them show a suggestion of the hump peculiar to the latter, and in mature bulls it is well developed. Their hide is well fibered, exceptionally uniform in thickness and texture, and the hair is so short as to suggest having been closely clipped. Also, the hides are firm and unusually free from abrasions. Tick marks are not found on them, because this particular breed of cattle is immune to the tick and all other parasites. Grubby hides are also unknown in the Philippines. The only abrasions are from the brands, and these are usually reasonable in size and placed well down on the flank. These hides run in weight from 22 to 45 pounds.

The only other domestic cattle are a few half-wild ones of Spanish breed which find their way to market occasionally. They do not produce a desirable hide. It is usually badly scarred and from a poorly nourished or aged animal.

The only other hide-producing animal in the Philippines is the horse. These animals are really of two classes, the horse and the Philippine pony. Some of the latter are 51 inches in height, but most of them are smaller. Both these animals are classed by the Government as horses, but the ponies far outnumber the horses proper. While a few of these animals are slaughtered for food (1,057 in 1915), most of their hides become available through natural death or death due to accident. Very few of the carcasses are skinned, so that no use is made of a considerable number of hides which should form a very valuable contribution to the raw material for the production of horsehide leathers. In Manila alone approximately 1,200 of these hides are burned with the carcasses every year. These hides will probably average 30 pounds each.

SHEEP AND GOAT SKINS.

Of skin-producing animals the goats are the most important. These skins, too, are largely wasted, because they are so wastefully used when used at all.

Sheep are the only other skin-producing animals, but inasmuch as the animals are a scrubby lot, too much must not be expected in the quality of the skins. No leather produced from either goat or sheep skins of the islands is immediately available, so a definite report as to their leather-making qualities can not be made.

Hogs are slaughtered in comparatively large numbers, but are never skinned. It is practically certain that this material would be available for purchase if a local market were offered for it.

The total number of animals in the islands in 1910 and 1915 was as follows:

Animals.	1910	1915	Animals.	1910	1915
Carabaos	705,758	1,221,866	Hogs	1,637,338	2,521,143
Cattle	243,180	534,106	Goats	422,185	644,026
Horses	138,199	223,195	Sheep	88,805	129,470

The number of animals that died or were slaughtered in 1915 was as follows: Carabaos, 40,364; cattle, 64,646; horses, 7,305; hogs, 632,477; goats, 106,025; sheep, 17,817.

METHODS OF HANDLING HIDES.

Flaying.—The take-off of the hides is only fair. A far too great proportion show damaging cuts. This fault is probably due to the generally unorganized condition of the hide and skin business. If concerted action were taken, the knife would be used less and the cuts and scores reduced to a minimum. All that is needed is to show the butchers that it would pay them to flay the hide carefully and reforms would be instituted forthwith.

Trimming.—The legs are cut off at the hock and knee and a circular cut inward is made at the tail. The face is left on. The meat is well trimmed from the hide, usually by women who frequent the abattoirs to see what they can salvage.

Weights.—Hides are sold by the piece, not by weight. At present (July, 1917) cattle hides are being sold in Manila at $6.25 each with 25 per cent additional for the heavy hides. These are probably the top prices. The weight of hides from native cattle ranges from 22 to 40 pounds, and those from cattle imported from French Indo-China average 28 to 30 pounds. The Indo-China cattle are of the same general species as the native cattle but are somewhat smaller. Carabao hides weigh from 28 to 100 pounds and are being sold now (July, 1917) at about $5 each.

UNORGANIZED CONDITION OF HIDE AND SKIN BUSINESS.

There is no firm in the Philippines whose sole or even chief interest is dealing in hides and skins. Animals are slaughtered in abattoirs owned by municipal or provincial governments, the individual dealers paying a price per piece for the privilege. Very often the hides are taken direct from the carcasses to tanneries in the neighborhood, the tanners paying a price per piece direct to the owner of the animals and often before the animal is slaughtered. The carabao hides and what few hides come in from the outlying districts are simply the accumulations of Chinese or other traders, who handle and market them in a most haphazard manner.

PREVENTABLE WASTE.

The great waste in raw leather-making material, which is habitual in the Philippine Islands, ought not to be continued longer than is necessary to finance and organize the business. An estimate of the waste may be gained from the following 1915 figures:

Carabao hides, only partly used	40,364
Cattle hides, nearly all used	64,646
Horse hides, practically none used	7,305
Total domestic production	112,315
Imported, approximate number	118
Total	112,433
Hides tanned, approximate number	95,000
Hides exported, approximate number	2,649
Approximate total	97,649
Hides unused, approximate but fairly accurate	13,784
Sheep and goat skins, practically unused	123,842
Skins imported, approximate number	198
Approximate total	124,040
Skins exported, approximate number	45,903
Skins unused, approximate number	78,137

These figures give a very fair estimate of the total waste, but the actual waste is even greater, for many of the hides putrefy before they reach the tanner or during the tanning process, because of the hot climate and the slow action of the tanning materials. Also, the leather produced is of very inferior quality, and the choice hides should not be used for the production of such inferior leather.

During the dry season all the hides and skins can be quickly sun-dried. During the rainy season they could be cared for in Manila and at collecting points by the efficient salt-pack method. The rainy season extends from June to October.

SUGGESTED ORGANIZATION FOR HIDE AND SKIN BUSINESS.

It appears that the best method of conducting an extensive business in hides and skins would be from headquarters in Manila, with proper financing and housing. Contracts could readily be made with the larger slaughterhouses in Manila, Iloilo, and Cebu for their entire take-off. Collection points could be established throughout the archipelago in charge of Chinese or other storekeepers, who would either pay cash or barter for the stock and care for it, thus furnishing the natives with a market which they would appreciate. Inter-island transportation is well established and in normal times adequate, so that the various accumulations could be shipped to Manila for local sale and export.

The management would have to be vested in a person thoroughly familiar with the business methods of the diversified peoples, the islands, and, of course, with hides and skins. It is very doubtful whether an American could come to the islands and manage such an enterprise successfully unless at least assisted by a person so qualified.

The international trade of the islands in hides and skins is not of great importance at present, but if the business were properly organized it would develop into a rather important trade.

IMPORTS AND EXPORTS OF HIDES AND SKINS.

Statistics of the imports of hides and skins into the Philippine Islands in 1913, 1914, 1915, and 1916, showing the quantity and value from each country, are given in the following table:

Articles and countries of origin.	1913		1914		1915		1916	
	Kilos.	Value.	Kilos.	Value.	Kilos.	Value.	Kilos.	Value.
Cattle hides:								
Guam	....	....	276	$25	....	....	....	....
China	182,414	$54,170	209,675	61,312	74	$41	....	....
French East Indies	....	....	26	2	681	38	188	$46
Hongkong	9,684	2,583	....	....	....	....	....	....
Japan	....	....	4,688	1,470	....	....	....	....
Australasia	9,499	1,334	4,788	463	1,130	117	200	42
Total	201,597	58,087	219,453	63,272	1,885	196	388	88
All other hides and skins:								
United States	546	479	2,160	1,625	1,226	1,245	504	663
United Kingdom	5	50	....	....	....	....	86	26
Germany	....	....	1	3	....	....	....	....
Spain	....	....	....	....	2	29	2	12
China	9	35	27	22	68	148	504	206
British East Indies	24	93	5	16	2	4	188	56
French East Indies	5	4	6	12	11	18	145	63
Japan	38	90	32	91	72	280	66	45
Siam	....	....	....	....	15	10	....	....
Total	627	751	2,231	1,769	1,396	1,734	1,495	1,071

Details of the exports of hides and skins for the same period are as follows:

Articles and countries of destination.	1913		1914		1915		1916	
	Kilos.	Value.	Kilos.	Value.	Kilos.	Value.	Kilos.	Value.
Carabao hides:								
China	....	....	....	....	....	....	1,828	$312
British East Indies	801	$170	485	$187	627	$120	1,420	311
Hongkong	8,517	1,494	9,808	1,713	41,549	6,939	4,877	801
Japan	....	....	....	....	128	35	....	....
Total	9,318	1,664	10.653	1,900	42,152	7,094	8,125	1,424
All other hides:								
United States	....	....	1,950	1,000	2,591	750	345	90
United Kingdom	....	....	2,000	375	....	....	....	....
China	9,791	1,157	16,644	2,387	13,917	1,689	47,847	13,284
German China	....	....	....	....	....	....	10,461	4,740
British East Indies	7,519	1,940	8,266	2,422	11,833	3,166	27,911	9,515
Hongkong	28,085	2,410	17,150	2,863	16,727	2,992	35,571	10,205
Japan	....	....	....	....	391	130	19,085	5,722
Australasia	....	....	....	....	1,444	500	....	....
Total	45,395	6,507	46,010	9,047	46,903	9,227	141,220	43,556
All other hides and skin,:								
United States	....	....	....	6	....	....	....	211
Belgium	....	....	....	10	....	....	....	....
China	....	10	....	....	....	62	....	....
British East Indies	....	606	....	339	....	....	....	....
Hongkong	....	3,498	....	9,669	....	3,875	....	6,726
Japan	....	120	....	....	....	....	....	16
Total	....	6,234	....	10,044	....	3,837	....	6,953

TANNING INDUSTRY.

Leather manufacture in the Philippines is important only to the islands. None of the locally tanned leather is exported. Altogether there are about 175 tanneries devoted almost exclusively to the tanning of sole and undressed heavy leather. The total output probably does not exceed 95,000 hides per year. The industry is wholly in the hands of Chinese and native Filipinos.

MACHINERY AND METHODS.

The tanning machinery in the Philippines is limited to a bark mill in one tannery and a sole leather roller and three drums in another. Just at present the roller and the drums are not in use. The latter tannery is managed by a graduate of the Leather Sellers' Technical College, of England, and in time will undoubtedly develop into a modern plant. Primitive methods, probably brought to the islands by the Chinese, are still in use.

Most of the tanneries are in the open air, or merely sheltered by a thatched bamboo roof. When the hides are received they are laid in packs of 17 or 20 and soaked for about eight hours. This soaking is usually done in the river. For liming they are put into pits usually built of masonry and arranged in a series of 3 or 4 to as many as 20. These pits are of a practically standard size, 5½ feet long, 3½ feet wide, and 3 feet deep. Sometimes they are built above ground and sometimes partly below. The liming solution is made by mixing 25 liters (about 3 pecks) of lime in nearly enough water to fill the pit. A cane or bamboo sieve is used to remove lumps and stones from the lime. The hides are then folded lengthwise, hair out, and placed in the pit one on top of the other until the pack is complete. They are left in the lime 10 to 15 days and during that time are handled three or four times. The pack is inverted at each handling.

Unhairing and fleshing are usually done by a workman who stands in the water of the river and works on the hide laid over a bamboo beam. This is a slow process because the bamboo beam is narrow and the flesher works toward himself. The beam is generally at too high an elevation to be convenient. The fleshings and cuttings are mixed with the lime, dried, and sold for glue stock. The proceeds are usually equally divided between the tanner and the workmen.

TANNING MATERIAL AND PROCESSES.

The tan pits are of practically the same construction as the lime pits but a little larger. The tanning liquor is made of chopped camanchile bark (25.36 per cent tannin) mascerated for three days in a mixture of two-thirds fresh water and one-third used liquor. The strength of the liquor thus made is uncertain, for no measuring instruments are used. The proportion of bark used is 250 to 300 pounds to 1,200 liters (317 gallons) of liquid. After soaking for three days, the bark is removed from the pits and the hides put in. A layer of bark is left on the bottom onto which a hide is placed flesh side down. Then a layer of bark is placed over the grain side and half of the hide folded over. This process is repeated until the vat is filled, each hide and the whole pack being treaded down by the nearly naked workman who lays the pack. This treading is repeated often during the first few days to hasten the penetration of the hide by the tanning liquor and to prevent putrefaction. The hides are then left in the tan pits for about six weeks. It is said that if the leather is not to go to market immediately the hides are placed in vats containing old used liquor and left indefinitely—sometimes for years.

In preparing the tanned hides for market they are spread on a platform, where natives scrape the water and tanbark from them and smooth the surface as much as possible. Then they are stretched on bamboo sticks and quickly dried in the full glare of the tropic sun. This is all the treatment they receive at the hands of the tanner. The user dresses them to suit his individual requirements.

INFERIOR QUALITY OF LEATHER PRODUCED.

The temperature is so high, the action of the tanning material so slow, and sometimes the hides in such poor condition, that many of them are lost by putrefaction. So far, no process has been found by these tanners to overcome this difficulty. It is quite possible that the use of extracts with the bark would eliminate much of the trouble. In only one tannery are the hides suspended in the vats and in only one tannery are extracts being seriously considered. Cleanliness and better water would also have a beneficial effect.

The leather resulting from these crude methods is naturally very inferior. The poor grade of lime, the temperature, filth, and crude methods all tend to destroy hide substance.

The Chinese are the only tanners producing light leathers. These are simply the result of splitting heavy hides, usually carabao. The splitting is done with a thin, axe-shaped knife operated by hand. The operation is insufferably slow but the workmanship is wonderful.

The leather is used almost wholly by the native and Chinese shoemakers, who buy it from native and Chinese leather dealers, to whom it is sold by the tanners.

SUPPLIES OF NATIVE TANBARKS.

The Philippine Islands are well supplied with raw tanning materials. Chief among them are camanchile and mangrove barks. There are a number of other barks, but they are either too low in tannin content or insufficient in supply to be commercially important.

CAMANCHILE BARK.

Camanchile bark is the favorite tanning material among the tanners of the islands. It contains about 25 per cent tannin and produces a light-colored leather. The tree is found in nearly all parts of the islands, though its growth is scattered. It is neither systematically cultivated nor conserved. Camanchile tan liquor quickly ferments in the Philippine climate and creates a strong, disagreeable odor. This bark will probably never be of commercial interest or importance outside the islands. About 1,500 tons are used annually by local tanners. Two or three years ago the bark was purchased from the native collectors at $10 a ton, but the price has recently risen to $35 per ton.

ABUNDANT SUPPLIES OF MANGROVE BARK.

The Philippines have mangrove swamp areas estimated at 800 square miles. There are 21 species of mangrove, or 2 more than are credited to Borneo, the great cutch-producing island. While nearly all the islands of the archipelago have considerable growths of mangrove, the swamps of Mindoro, Mindanao, and Palawan are of greatest commercial importance, and none of them are being worked at present for tanning material.

The swamps of Mindoro are only 12 hours distant by steamer from Manila, are large in area, and practically virgin. Many of the swamps in the northern islands have been pretty well cut. It is estimated that the Mindoro swamps will yield about 50,000 tons of bark. The swamps of Mindanao extend along the coast for 45 miles and it is estimated that about 90,000 tons of bark are available here. Extensive lumbering operations are being carried on in Mindanao now, but the lumber companies do not use the bark at all.

The demand for tanning material, the free trade between the Philippines and the United States, the advantageous position of the Philippine growths, and the comparative ease with which large supplies of bark can be secured as by-products from other enterprises, indicate that the Philippines are worthy of especial consideration for new undertakings in cutch production. Detailed information may be obtained on application to the Director of Forestry, Manila, P. I.

SAMPLES OF PHILIPPINE LEATHER GOODS.

The following samples of the Philippine leather manufactures, transmitted in connection with the foregoing report, are on exhibition at the sample room of the New York district office of the Bureau, Room 734, Customhouse, New York City:

One pair of low tan shoes, made by hand at Mariquina, Luzon. All native work; uppers of American calfskin, skived and folded by hand; insole, carabao leather; outsole, vaca leather, tanned with camanchile bark; no machines used. Wholesale price, $2.25.

One pair of high black shoes, made of materials similar to above, native workmanship. Wholesale price, $2.25.

One pair of high tan shoes, made of American materials by Filipino workmen in an American-operated factory. Retail price, $5.

One piece of vaca hide.
One piece of carabao belly.
One carabao outsole.
One carabao insole.

Lists of the principal shoe importers, leather dealers, and tanners may be obtained from the Bureau of Foreign and Domestic Commerce or its district and cooperative offices. Refer to file 1314.

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DEPARTMENT OF COMMERCE
BUREAU OF FOREIGN AND DOMESTIC COMMERCE
B. S. CUTLER, Chief

SPECIAL AGENTS SERIES—No. 162

COLOMBIAN MARKETS FOR AMERICAN FURNITURE

By

HAROLD E. EVERLEY
Special Agent

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LETTER OF SUBMITTAL.

Department of Commerce,
Bureau of Foreign and Domestic Commerce,
Washington, December 20, 1917.

Sir: There is submitted herewith a report on the markets for American furniture in the Republic of Colombia, the first of a series of reports by Special Agent Harold E. Everley, who in the course of his investigations for the Bureau will visit most of the South American countries. Mr. Everley finds that the market for furniture depends to a very marked degree on climate, transportation facilities, and the extent to which modern conditions and methods of life have developed among the people. The influence of these factors in Colombia is, on the whole, adverse. Obstacles will be encountered by the American manufacturer who undertakes to introduce his goods in that market. Mr. Everley believes, however, that the sales of the United States are destined to increase steadily and that a substantial trade will be established in this line. Colombia now ranks second among South American countries in purchases of American furniture. With a view to eliminating certain of the difficulties and causes of friction that have existed in the past, the writer takes up one by one the salient factors in the Colombian field, giving illustrations of costly mistakes that might easily have been avoided and pointing out various ways in which commercial transactions may be facilitated. Statistics of imports are presented, the best methods of entering the market are indicated, and each of the principal classes of furniture is considered in detail.

Respectfully,

B. S. Cutler,
Chief of Bureau.

To Hon. William C. Redfield,
Secretary of Commerce.

COLOMBIAN MARKETS FOR AMERICAN FURNITURE.

I. INTRODUCTION.

GENERAL CONDITIONS AFFECTING COLOMBIAN COMMERCE.

Colombia, the third largest country in population and the fourth in area on the continent, was in 1916 the second best South American buyer of United States furniture. It is the only country in South America with outlets on both the Atlantic and Pacific Oceans. This advantage and that resulting from the use of the Panama Canal, together with its diversified resources and close proximity to the United States, make Colombia a market of noteworthy, though somewhat indefinite, potentialities.

The general commerce of the country, up to the outbreak of the war, was rapidly growing. The total trade in 1911 amounted to $41,484,762 and in 1913 had increased to $62,851,032. During the war the furniture trade with the United States has gradually improved. The total value of the furniture imported from the United States into Colombia in 1916 was $73,232. This amount, compared with $33,447 in 1912, shows a substantial growth. While it is true that this trade is gradually increasing, Colombia must not be considered an easy, ready market. Before the furniture manufacturer or exporter can successfully enter this field it will be necessary for him to acquaint himself with the nature of the existing obstacles and prepare to meet the difficulties that he is sure to encounter.

Possibly the three most important factors affecting the importation of furniture into Colombia are the climatic conditions, the characteristics of the people, and the transportation facilities. A thorough understanding of these factors and their influence upon trade is necessary before a profitable and growing business can be developed.

EFFECT OF CLIMATE ON FURNITURE REQUIREMENTS.

On the coasts of Colombia the climate is tropical, as the Republic lies approximately 12° north and 4° south of the Equator. The great Andean barrier that crosses the country from north to south acts as a condenser for the easterly winds from the Atlantic Ocean and causes a very heavy rainfall over the eastern section. High temperature, as well as excessive humidity, prevails throughout this region. The temperature ranges from 80° to 84°, with a rainfall of 100 to 150 inches.

The tropical climate of the coast regions has a great influence upon the lives and customs of the inhabitants. It determines largely the architecture of their homes and the manner of furnishing them. Because of the intense heat, the houses are built with large rooms.

The ceilings are high and the floors are usually of tile or cement. High temperature and excessive moisture limit the use of curtains about the windows and doors; carpets and rugs are little in evidence, and upholstered furniture is not used because of its warmth and susceptibility to attacks of insects. A minimum amount of furniture tends to give the most comfort. People live to a great extent out of doors, and for this reason furniture—with the exception of what is absolutely necessary, such as chairs, tables, wardrobes, and iron beds—is not in great demand in this region of Colombia.

Not only do the climatic conditions limit the amount of furniture used in the Tropics, but they determine largely the type demanded. Because of the climate, cool and light but strong furniture is required on the coast. Chairs with solid or upholstered seats and backs are not popular, but those of reed, rattan, and similar material are desired. This lighter furniture, however, is never fitted with cushions for the tropical districts.

Besides influencing the amount and type of furniture, the climate also determines largely the method of constructing it. Where there is excessive heat and moisture, built-up and veneered furniture is not practical. Such furniture, manufactured under dissimilar climatic conditions, soon absorbs a large amount of moisture in the Tropics, which causes it to swell and the veneer to peel off. No furniture manufacturer should ship veneered furniture to the tropical section of Colombia with the hope of building up trade. The past experience of the Colombian people with veneered furniture has been very unpleasant, and they now buy only that which is woven or is of solid wood or steel.

The effect upon the furniture trade of the temperate and cool climate of the plateaus and mountainous regions is quite the reverse of that noted in the hot coastal plains. The climate of Bogota, the capital of Colombia, which stands on a plateau at an elevation of 8,600 feet, is mild, the temperature averaging 54° to 65°. In this city there are many beautiful and well-furnished homes and offices. With a climate that is delightfully cool and salubrious the year round, there comes a demand for more elaborate and better furniture.

As the nature of the market depends largely upon climatic conditions, it will be necessary for the manufacturer or exporter to consider with some care the kind of climate to which his product will be subjected. This is especially important if the market be Colombia.

RACIAL DIFFERENCES.

The characteristics of the inhabitants of the various political divisions of Colombia differ greatly, and have a decided influence upon the furniture market. Probably about 10 per cent of the inhabitants (who total approximately 5,000,000) are of pure white blood. They are the descendants of the Spanish colonists who settled in Colombia during the three centuries following the discovery and conquest. Mining and climate drew them into the highlands of the interior, where they form the governing class. These white Colombians, as a whole, are well educated, and many of them have traveled. Although they inhabit the plateaus far in the interior, they are acquainted with the customs and products of other countries and, as a rule, demand a high grade of furniture. However, this group represents so small a percentage of the total population that the market for the best quality of furniture will always be relatively small.

The next most important group of the inhabitants comprises the "mestizos"—a mixture of Spanish and Indian. They live chiefly on the plateaus and represent the greatest percentage of the population. This is a significant fact, because it implies a persistence of type that may largely determine the character of Colombian population, unless the slowly increasing white element be reinforced by immigration. The mestizos are a sturdy, patient race and are sufficiently industrious to carry on many of the small industries and occupations and meet the labor requirements of the inhabited plateau districts. In the rural districts the mestizos are small agriculturists, herders, laborers, and fishermen, but there are also many educated, successful merchants and professional men among them. This group, as a whole, offers an extensive market for the cheap and medium grades of furniture, which are now finding their way into the country.

There are more than 300,000 Negroes and mulattoes in Colombia. They represent the poorer, less progressive part of the people. Their dwellings are rude huts, and their furniture consists mainly of homemade articles or purchases from a secondhand store. Very few, if any, of this class ever buy imported furniture.

The remainder of Colombia's population consists of 150,000 Indians. They retain their own dialects and customs and have the attitude of a conquered race, submitting to the customs and requirements of a social organization of which they form no part. The huts of these Indians are furnished as were those of their ancestors, and the owners, of course, can not be considered as buyers of any kind of furniture.

TRANSPORTATION DIFFICULTIES.

The peculiar geographical features of Colombia have rendered transportation a very difficult undertaking. Only on the great waterways of the Magdalena Valley has nature provided anything like easy means of communication. The Magdalena River is at present the only available outlet from Bogota, the capital of Colombia, to the Atlantic coast. Over certain parts of this river's course navigation is very difficult on account of rapids. It does not afford through traffic and is supplemented by short lines of railroad over which merchandise and produce must be transferred no fewer than six times in going from the coast to Bogota, and, if sent to some other cities, goods must be conveyed by pack animals and even on human backs at a great cost and the risk of total loss before they reach their destination.

Colombia's great need is better means of transportation. Railroads totaling only 775 miles serve a population of more than five million people, and the larger part of this population is found in the richest, most productive section of the country—the mountainous districts of the interior, which are separated from the seaports by low, swampy, malarial plains and perplexing mountain ranges. At present the transportation difficulties are tremendous, and the magnitude that might be attained by industry and commerce under the stimulus of adequate facilities would be difficult to estimate. The present freight rates between the principal seaports and the capital are almost prohibitive, and the products of the great Cauca Valley reach the sea by almost the same means that were employed in Spanish colonial times.

Transportation in Colombia is a pertinent factor to the furniture manufacturer and exporter. It necessarily influences the type of furniture that will find a market in the country. Bulky furniture, such as most case goods, and that which can not be shipped in knocked-down form, will never enjoy a ready sale there, because of the prohibitive expense of shipping it. Furthermore, the lack of adequate means of transportation will determine the type of packing to be used. From the port of entry to inland cities, goods are subjected to the handling involved in shipments by water, rail, and pack animals, and, at the transfer places, may lie exposed to tropical rains or heat for hours with no other protection than their own coverings. When the transportation difficulties are thoroughly understood, and proper precautions are taken to insure safe arrival of goods at their destination, the furniture trade between the United States and Colombia will be greatly augmented.

II. STATISTICS OF IMPORTS.

Before the statistics of Colombia's foreign purchases of furniture are given, attention may be called to the favorable trade balance of that country in the United States.

The total foreign trade of Colombia for the year 1913 amounted to $62,851,032, of which $28,535,780 represented the imports and $34,315,252 the exports. The figures for 1914 were: Imports, $20,979,229; exports, $32,632,884; total, $53,612,113. In comparison with 1913 there was in 1914 a decrease of $7,556,551 in imports and $1,682,368 in exports, or a total decrease of $9,238,919 in Colombia's foreign trade. The balance of trade in favor of the Republic for 1913 was $5,779,472, and for 1914 it was $11,653,655. The decrease in Colombian trade for 1914 was due to the war in Europe.

In 1915 the commerce of Colombia amounted to $49,419,522 and showed a favorable balance (exports over imports) of $13,738,822. Of the total trade, $31,300,000 was with the United States, and this portion alone resulted in a balance of $12,700,000 in favor of Colombia. In other words, the United States consumes nearly 70 per cent of the exports of Colombia but supplies only 52 per cent of the imports.

The following table shows the favorable trade balance of Colombia with the United States for the years 1913, 1914, and 1915:

Years.	Exports.		Imports.		Balance in favor of Colombia in trade with United States.
	Total.	To United States.	Total.	From United States.	
1913	$34,315,252	$18,861,800	$28,535,780	$7,629,500	$11,232,300
1914	32,632,884	18,272,232	20,979,229	6,486,749	11,785,483
1915	31,579,172	22,000,000	17,840,350	[a] 9,300,000	12,700,000

[a] Approximate.

A study of the available sources of information on the imports of furniture into Colombia has revealed the fact that there are no statistics that give an adequate classification of all the articles included in the term furniture, and there are no possible means of arriving at any but an approximate estimate of the total value of all kinds of furniture imported into the Republic. It was also discovered that uniform methods of classifying furniture are not used at the customhouses in the different ports of entry, and, furthermore, the annual statistics published by the Government fail to give the classifications of furniture with the countries of origin. The best that can be done is to take the statistics and classifications given in the official records at the customhouses of Barranquilla and Cartagena, the two most important ports of Colombia. As the entries of merchandise at Barranquilla and Cartagena comprise 81 per cent of the country's total imports, the amount of furniture passing through these two cities represents approximately that percentage of the furniture entering the country.

The following analysis, by countries of origin, shows approximately 81 per cent of the total imports of furniture for the three years 1914, 1915, and 1916 and the first four months of 1917:

Classifications and countries of origin.	1914		1915		1916		Jan.-Apr., 1917.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
Furniture fitted with mirrors and marble tops:								
France	7,242	$5,683	9,066	$3,417	19,982	$3,901	563	$168
Germany	2,081	252	2,750	....	....	....	....	....
United Kingdom	1,920	417	3,971	1,083	44	23	....	....
United States	792	25	193	470	2,950	270	35	6
All other	....	....	....	48	....	....	....	....
Total	12,035	6,377	15,980	5,018	22,976	4,194	598	174
Furniture of fine woods, inlaid with rosewood, mahogany, or walnut; also furniture of ordinary woods veneered:								
France	1,991	472	1,790	314	2,294	777	171	24
Germany	1,929	250	....	....	....	....	....	....
United Kingdom	1,258	341	943	268	....	....	....	....
United States	1,174	217	1,573	1,452	1,458	345	....	....
All other	316	29	448	....	....	....	....	....
Total	6,668	1,309	4,754	2,034	3,752	1,122	171	24
Ordinary cheap wooden furniture, such as chairs, tables, etc.; cheap office furniture:								
France	4,743	931	4,149	546	976	319	182	38
Germany	135,163	22,881	....	....	....	....	....	....
United Kingdom	29,722	3,035	554	71	1,078	312	....	....
United States	131,784	18,091	189,967	12,000	277,475	16,615	90,642	9,743
All other	5,361	1,075	6,573	711	46,987	5,932	24,389	4,060
Total	306,773	46,013	201,243	13,328	326,516	23,178	115,213	13,841
Furniture upholstered with hair, linen, or like materials:								
France	1,326	512	585	281	2,992	684	....	....
Germany	59	15	....	....	....	....	....	....
United Kingdom	....	....	409	104	....	....	....	....
United States	....	....	847	95	1,980	147	398	57
Total	1,385	527	1,841	480	4,972	831	398	57

Classifications and countries of origin.	1914		1915		1916		Jan.-Apr., 1917.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
Furniture upholstered with silk or leather:								
France	2,686	$487	2,301	$812	1,336	$393	600	$73
Germany	....	....	....	....	....	....	....	....
United Kingdom	....	....	1,346	270	167	57	....	....
United States	....	....	132	15	783	114	....	....
Total	2,686	487	3,779	1,097	2,286	564	600	73
Furniture of steel or iron:								
France	9,893	645	2,184	237	504	60	556	82
Germany	9,783	798	....	....	....	....	....	....
United Kingdom	120,082	12,836	28,085	3,455	9,134	597	1,403	154
United States	125,721	6,618	111,733	12,015	425,884	19,586	66,378	5,916
All other	1,269	190	704	381	48	10	1,744	155
Total	266,748	21,087	142,706	16,088	435,570	20,253	70,081	6,307
Furniture of bronze or brass, beds, etc.:								
France	6,094	1,448	1,379	412	3,135	738	....	....
Germany	2,041	151	....	....	....	....	....	....
United Kingdom	16,156	2,799	5,086	1,137	191	84	1,720	539
United States	11,831	1,373	18,946	2,232	45,863	4,071	18,735	2,399
Total	36,122	5,771	25,411	3,781	49,189	4,893	20,455	2,938
Furniture of reed, rattan, and like materials:								
France	....	....	345	147	....	86	158	19
Germany	1,199	217	....	....	....	....	....	....
United Kingdom	539	119	....	....	....	....	1,365	454
United States	10,038	2,301	28,014	6,074	8,562	7,464	34,368	7,445
Total	11,776	2,637	28,359	6,221	8,562	7,550	35,891	7,918

A study of the above table shows that the largest share of the trade in furniture fitted with mirrors and marble tops and in that upholstered in silk or leather has been in the hands of the French. This is principally due to the intimacy of the people of the two countries. The largest colony of Colombian people outside their own country is in Paris. Also, during the French occupation of the Panama Canal, great numbers of French people went to Bogota, the seat of the Colombian Government. Besides the close relations of the two peoples, the better quality of goods and superior methods of packing for export trade have greatly aided trade with France in the kinds of furniture mentioned above. The French manufacturers use great care in packing so as to minimize freight expense and guard against damage to goods in transit. It is also claimed by the furniture dealers of Colombia that French mirrors are superior to those made in the United States. French mirrors will withstand the climate of Colombia for years, and this can not be said of the American mirrors, many of which become worthless in a very short time.

The statistics further indicate that the most important trade in furniture is that in the cheap and medium grades made of wood, followed by a rapidly increasing demand for reed, rattan, and metal. Previous to the war, Germany held the largest share of the business in the quality first mentioned. This was due to the popularity of the Vienna or Austrian bentwood furniture, which has been imported into Colombia in large quantities. Since the war has eliminated Germany as a competitor, American makers have been fortunate enough to obtain most of Colombia's trade in the cheap and medium grades of furniture. However, it will be necessary for the American manufacturers and exporters to entrench themselves securely in this market, for Germany, which has been so successful in manufacturing a type of furniture that finds a ready market in the Republic, will probably be a competitor again after the war.

The most significant fact revealed by an analysis of the above table is that the kind of furniture finding the best market in Colombia is that which offers the least difficulty and expense in shipment—namely, the knockdown type. If American manufacturers and exporters will make a special effort to supply such furniture in good designs and qualities, they will be better able to meet the competition of European countries.

III. SPECIAL FACTORS INFLUENCING TRADE.

SHIPPING FACILITIES.

Previous to the war Colombia had excellent ocean transportation facilities, with direct service to the United States, England, Spain, France, and Germany. Cartagena and Puerto Colombia, the two most important ports of the country, were regular ports of call for the steamers of the Royal Mail and the Hamburg-American, the Compagnie Générale Transatlantique, La Veloce, the United Fruit Co., and several less important lines. On the Pacific side of Colombia, local steamers of all lines make regular stops at Buenaventura and Tumaco. Since the war began some of the lines mentioned have suspended and others have modified their service. The Royal Mail Steam Packet Co. still has two steamers monthly from New York, while the United Fruit Co. has one steamer weekly from New York and one from New Orleans for Cartagena, Puerto Colombia, and Santa Marta. These lines have excellent passenger and freight accommodations and have done much to increase the trade of Colombia. However, the marked increase in freight rates in 1916 has caused the Colombian merchants to become very conservative in their purchases of foreign goods.

CONDITIONS AT PORTS.

The principal ports on the west coast of Colombia are Buenaventura and Tumaco. These cities have no modern docking facilities and all goods must be lightered ashore. On the Caribbean coast Santa Marta, Puerto Colombia, and Cartagena are the main ports of entry. The bay of Santa Marta offers a safe anchorage during the entire year. There are good docking facilities, with wharf accommodations for large steamers. One of the most important ports of Colombia is Puerta Colombia, which is at the mouth of the Magdalena River and connected by rail with Barranquilla, 18 miles distant. Here the ocean-going steamers may dock and discharge their cargoes directly onto a train, which transfers everything to the customhouse in Barranquilla. If goods are consigned to cities in the interior, they are taken from the customhouse to the river steamers in carts after passing the customs.

The port of Cartagena is on a beautiful bay, 15 miles in length and 6 in width. The entrance to it is through a narrow mouth and thence by a channel across the bay that has sufficient depth for ocean liners of 30,000 to 40,000 tons. This channel ends at a wharf of timber 500 feet long and 120 broad. Berthing at the wharf, the steamer anchors alongside a building containing the customs warehouses, into which goods are unloaded directly from the ships. After goods consigned to merchants in interior cities have passed through the customhouse they are loaded into freight cars and shipped to Calamar, where they are put aboard the river boat by means of a powerful crane, thus eliminating the rough handling that they would otherwise receive.

While the greatest part of Colombia's imports enter the country through Puerto Colombia, there are three very decided advantages in the Cartagena route that furniture manufacturers and exporters should note. First, the excessive handling required in transferring cargo from the ship onto railway trucks in order to take it to the customhouse, in the unloading at the customhouse, and in the reloading after examination, when goods enter by way of Puerto Colombia, does not occur at Cartagena, and this fact gives fragile cargo like furniture a very valuable safeguard against breakage or any other kind of damage caused by transshipment. Second, the use of carts, which is destructive to goods on account of the frequent carelessness of the cartmen, is also avoided. Third, the expense of $0.40 to $1 a ton that is charged for this service is eliminated. The above-mentioned advantages are of inestimable value, and should be taken into consideration when shipments are routed for the interior of Colombia.

INTERIOR TRANSPORTATION.

The lack of adequate interior transportation facilities is the primary reason for the excessive freight rates and the difficulties that stand in the way of increased trade with Colombia. Railway building in that country has made very little progress, and the roads now in use are only short lines—most of them supplementary to the river transportation, which at times is very uncertain and subject to many delays. Traffic is forced to go by way of Puerto Colombia or Cartagena and to make connections by rail with the river boats, which are stern-wheelers of 150 to 400 tons. The river does not offer through navigation, being obstructed by rapids around which freight must be sent by rail from La Dorada to Beltran. Here goods must again be transferred back to the " upper river " boats and taken to Girardot. From Girardot to Bogota they are sent by rail over two roads owned by separate companies. The two railroads are of different gauge, necessitating another transfer of goods bound for Bogota. It takes passengers from 11 to 14 days, according to the height of the river, to make the trip from Barranquilla or Cartagena to the capital city of Colombia. Freight requires almost twice as much time, and from the port of entry to Bogota goods are subjected to six or more transshipments and delays, usually involving exposure to the tropical sun and rains without sufficient protection. Naturally, the freight rates are high.

In the following statement will be found the freight and other charges for 1 metric ton (2,205 pounds) of furniture from Puerto Colombia or Cartagena to Bogota. In case the freight does not weigh a ton, charges are made by the cubic contents of the packages, 2 cubic meters (approximately 69 cubic feet) equaling a ton by measurement.

Via Puerto Colombia:

Railway freight, Puerto Colombia to Barranquilla, per ton	$3.63
Plus 3 per cent	.11
Cartage in Barranquilla, customhouse to river port	.40
Loading and unloading	.80
River freight, Barranquilla to La Dorada, $14 less 10 per cent discount ($1.40)	12.60
Government river tax	4.00
Total Puerto Colombia to La Dorada, per ton	21.54
Freight from La Dorada to Bogota by rail, per ton	33.00
Municipal tax	4.00
Total, La Dorada to Bogota	37.00
Charges from Puerto Colombia to La Dorada	21.54
Total charges from Puerto Colombia to Bogota per ton	58.54

Via Cartagena:

Railway freight from the docks to Calamar, per ton	5.00
River freight from Calamar to La Dorada, $12.75 less 10 per cent discount ($1.27)	11.48
Loading and unloading	.80
Government river tax	4.00
Total charges from Cartagena to Calamar, per ton	21.28
Freight from Calamar to Bogota, per ton	33.00
Municipal tax	4.00
Total charges from Calamar to Bogota, per ton	37.00
Charges from Cartagena to Calamar	21.28
Total charges from Cartagena to Bogota, per ton	58.28

When goods are shipped to Medellin they are unloaded at Puerto Berrio, six days' journey up the river from Puerto Colombia or Cartagena and two days' journey from Medellin by rail, carriage, and mule back. On this trip cargoes are subjected to severe handling and must be well packed to withstand the trip. The following charges per ton are made for freight from the port to Medellin. The transportation company reserves the right to charge either by measurement or by weight.

Via Puerto Colombia:

Railway freight and other charges from Puerto Colombia to Puerto Berrio	$20.19
Railway freight, Puerto Berrio to Cisneros	10.90
Road freight, Cisneros to Botero (average)	16.00
Railway freight, Botero to Medellin	4.80
Cartage in Medellin	.80
Municipal tax in Medellin	12.00
Commission agents' fees at Puerto Berrio, Cisneros, Botero, and Medellin	2.00
Total charges from Puerto Colombia to Medellin, per ton	66.69

Via Cartagena:

Freight and other charges from Cartagena to Puerto Berrio	19.93
Freight and other charges from Puerto Berrio to Medellin	46.50
Total charges for freight from Cartagena to Medellin, per ton	66.43

Freight for the city of Bucaramanga, the capital of the Department of Santander, is unloaded at Bodega Central, four days from the coast by river steamer. The trip from Bodega Central to Bucaramanga is made in six days by a small steamer, canoe, and then mule back. No rate to Bucaramanga could be obtained, but it is fair to assume that it is approximately as high as to the other inland cities.

The existence of these transportation difficulties presents many discouraging features as regards the Colombian market for furniture. The average manufacturer of the United States, who is accustomed to highly developed transportation facilities, fails to realize the serious nature of the obstacles that he will encounter in entering this market.

PACKING FOR SHIPMENT.

The incorrect manner in which American furniture destined for Colombia is usually packed has long been the cause of much dissatisfaction on the part of customers. In many cases it has resulted in the Colombian merchant's turning to European competitors for the goods he formerly purchased in the United States.

There are many points to bear in mind when packing for export, especially for Colombia. Unless the manufacturer or exporter knows where his goods are going and the treatment they will receive, he will not be likely to pack them properly. Thus the first, and a very important, point in packing furniture for Colombia is a knowledge of its destination. Furniture for the interior cities will be subjected to very rough handling before it reaches the customer. The men in charge of shipping departments of American furniture factories apparently lose sight of the fact that goods going to the interior of Colombia will be transported not only by train and steamboat but also upon the backs of mules, oxen, and even men. Such means of transportation necessarily determine the kind of packing required to insure the safe arrival of merchandise.

The chief competitors of the United States in the furniture market of Colombia have succeeded so well because they were able to ship furniture knocked down. This is a very important consideration for American firms to keep in mind when they think of entering these markets. The popularity of European furniture is largely due to the fact that manufacturers have developed a type that can be cheaply and conveniently shipped and at the same time meet the needs of their customers.

A certain furniture merchant in Cartagena ordered several dozen chairs from the United States and the same number and type from Europe. The chairs from Europe came knocked down, 12 wrapped in a bundle that was sewed up in burlap. The American chairs came set up 12 in a crate. Not only did the merchant have a higher duty to pay (duty being payable on gross weight of package), but the freight bill was $20 a dozen more on the American than on the European chairs. This is one of many similar instances that occur regularly, emphasizing the fact that it is necessary for Americans to study the matter of shipping furniture to Colombia in knocked-down form.

As the duty on furniture is charged by gross weight, including the case, it is necessary that the packing be as light as possible, consistent with safe and easy handling. The general complaint of the Colombian merchant is that Americans do not show good judgment in regard to the weight and size of the boxes they use. In some cases goods are packed in boxes that are entirely too light and flimsy to withstand the voyage, while in others the containers are entirely too big and heavy for their purpose.

A good illustration of the latter condition was related by a prominent merchant of Barranquilla who had ordered some picture moldings from the United States. When they arrived he was surprised to find that the duty was exceedingly high. On receiving the merchandise he found that he had 100 kilos of molding in a box of just twice that weight. As the duty on molding is $0.25 per kilo and he was required to pay duty on the gross weight of the shipment, he found that the box the goods were shipped in cost him just $50.

Not only is it necessary for the exporter to consider the weight of the material he uses in packing, but he should remember that the means of transportation to some of the interior cities of Colombia determine largely the size of boxes or packages that he can advantageously use, since all goods shipped to Bucaramanga, Manizales, and Medellin must be carried part of the way on mule back. As a mule is seldom loaded with more than 150 kilos (330 pounds), equally divided on the two sides of the animal, it is necessary to ship furniture knocked down and packed in boxes of a size and weight convenient for handling. Great care must be exercised to make these boxes absolutely moisture-proof, for many times they are exposed to heavy tropical rains for hours.

The value of proper preparation and packing of goods for shipment can not be too strongly emphasized. The farsighted manufacturer, who is desirous of establishing his export business on a permanent basis, will see that extreme care is used in packing and shipping his products. There are a few American firms which, through long experience, have learned how to pack for the Colombian trade and are now enjoying a growing business. The Colombian merchant proves to be a steady and profitable customer when attention is paid to details that are vital to his success.

NECESSITY OF PROPER CLASSIFICATION.

All merchandise entering Colombia must be examined at the customhouse at the port of entry. To facilitate this inspection packing should be so done that all articles paying the same rate of duty will be found together. This not only obviates the possibility of heavier duty if the goods are not correctly classified but also hastens the dispatch of the goods. If goods are not found as declared in the consular invoice, it is necessary to open all the boxes in the entire shipment, thus causing annoying complications and loss of time. For goods going to the interior this is especially detrimental, as it is very seldom that care is used in repacking the cases after examination.

American manufacturers are prone to disregard the advice of Colombian merchants in reference to methods of packing. Since the customer is obviously better acquainted with the transportation facilities of his own country than is the manufacturer in America, it is always wise to follow the instructions that usually accompany an order. If directions are given limiting the size and weight of packages, the shipper should obey them or refuse the order. In presenting his requests the buyer is influenced by tariffs as well as docking and transportation facilities, and the exporter's complying with them may mean time and money to the importer and future orders for the manufacturer.

TYPES OF PACKING CASES.

Furniture that is sold to merchants in the cities on the coast, where it receives very little handling after leaving the boat, may be packed in boxes, the frames of which may be made of seven-eighths-inch material. In order to reduce the weight, however, the panels of the box should be only three-eighths to one-half inch thick. Panels over 2 feet in length or width should be reinforced by strips in order to keep them from being crushed in. In many places thin iron bands may be used with good results, but great care should be exercised to avoid large, heavy nails and other fastenings when they are not necessary. Often strong crates may be used to advantage in packing some pieces of furniture for shipment to coast cities, but this kind of packing should not generally be employed. Furniture that can be shipped in crates should be padded with excelsior and wrapped with light, moisture-proof paper and burlap.

To eliminate excessive weight, chairs may be knocked down and like parts packed together in bundles, well wrapped with straw and impervious paper. The bundle should be pressed and bound to secure all parts and the whole sewed up in burlap, around which should be placed light steel bands or other strong fasteners. This method has been successfully used by foreign competitors and should be immediately adopted by American exporters. Not only does this method effect a saving on freight rates but it greatly reduces the amount of duty charged on the chairs.

The boxes for furniture going to interior cities should be made as light as possible, yet such as to protect the contents thoroughly. The frame should be at least seven-eighths inch, with panels built up of tongued and grooved lumber not less than one-half inch thick. These boxes must be strong enough to withstand rough handling and yet not be excessively heavy. Also, it must be remembered that ship freight is charged according to the cubic space occupied; therefore all shipments should be as compact as possible.

MARKING OF CASES.

American furniture manufacturers and exporters should bear in mind that stevedores, freight handlers, and packmen in Colombia are not conversant with the English language and that the marking of boxes with "Handle with care" and "Glass" does not convey any meaning to them. The use of the Spanish words "Con cuidado" and "Vidrio," having the same meaning, is better, but does not always result in the cases being carefully handled. Many of the freight movers are illiterate, and in order to meet this deficiency some of our European competitors use signs, such as pictures of large bottles or wine glasses stenciled on the boxes in red or black paint. In this way the manufacturer may convey the thought of care to the men who can not read.

The marking of the box to indicate its number and weight should be carefully done. Failure in this respect is at present a cause of frequent complaint by firms dealing with American manufacturers and exporters. The gross weight should always appear upon the box in a prominent place. Care should be taken that this amount is correct and written in kilos, not in English pounds. Where there are several boxes of merchandise in a shipment they should be numbered so as to agree with the numbers contained in the invoice. Cases without numbers or with numbers not corresponding to the descriptions given in the invoice cause much delay and a heavy fine for the importer. All directions, numbers, and weights should be stenciled or brushed on with waterproof ink in letters at least 2 inches high. It is always best to place the markings on one end and one side of the box in protected places, such as the panels.

CUSTOMS CHARGES AND ADMINISTRATION.

Before shipping furniture to Colombia, exporters should familiarize themselves with the customs regulations governing its importation. For instance, wardrobes should never be packed with their mirrors fitted in place. The duty charged on such furniture is 40 cents per kilo (2.2046 pounds), plus surtaxes of 7 per cent of the duty. If the mirrors are shipped in a separate package they will pay duty at 35 cents per kilo on their gross weight, while the rate charged on the wardrobe will be only 20 cents per kilo. Chairs upholstered in silk or leather will pay $1 a kilo on the gross weight of the shipment. If the silk and leather coverings are shipped in a separate package, the duty on the chairs is only 20 to 30 cents per kilo. A similar condition prevails with respect to reed and rattan furniture. So far as possible, all upholstering should be packed and declared separately from the furniture on which it is to be used. Great care should be taken that even the smallest articles of one classification are not packed with those of another without being separately listed. The necessity of this is illustrated by the following incident. A certain piano dealer of Barranquilla received a shipment of several instruments. During the examination by the customs officials it was discovered that the keyboard of each piano had been covered with a silk scarf, a compliment from the manufacturer. The rate of duty charged on pianos is $0.07 per kilo, but silk scarfs pay the rate of $3 per kilo. The unfortunate dealer was obliged to pay the regular duty on the gross weight of the shipment plus a fine equal to double the difference of the duties resulting from the higher classification of the scarfs.

The following statement shows the method of classifying furniture and the duties charged per pound:

Furniture fitted with mirrors and marble tops, but not upholstered	$0.194
Furniture of fine woods or inlaid with rosewood, mahogany, or walnut; also furniture of ordinary woods, veneered but not upholstered	.146
Furniture upholstered with silk or leather	.485
Furniture made of steel or iron (this includes steel office furniture)	.082
Steel furniture fitted with mirrors or marble	.165
Ordinary cheap wooden furniture, such as chairs, tables, etc.; cheap office furniture	.097
Furniture upholstered in hair, linen, or like materials	.194
Furniture made of bronze or brass	.121
Furniture made of reed, rattan, or like materials	.097

The duties on advertising material are:

Catalogues	Free.
Advertisements on paper or cardboard of any quality, with or without cuts	$0.01
Commercial novelties made of iron finished in enamel	.097
Commercial novelties made of bronze or brass	.243
Commercial novelties made of aluminum	.388

It is important that the correct weight of every case or box appear in the manifests. If the weight declared varies much from the actual weight, whether it be more or less, the customer is fined 20 per cent of the duty on the difference. It is also important that the manifests and consular invoices be mailed to the customer on the same ship that carries the merchandise, as the importer is subject to a fine of 10 per cent of the duties imposed if he does not present the manifests within 72 hours after the arrival of the goods.

PREPARATION OF INVOICES.

Accuracy and care in preparing invoices will result not only in facilitating the clearance of a shipment but in a positive development of trade. Our European competitors realize this and place great stress upon the proper execution of all rules relative thereto. Invoices should be made out in both the English and Spanish languages. This entails but little additional labor on the part of the exporter and enables the shipments to be handled more easily and rapidly. Every effort should be made to supply all possible information to insure the proper clearance of merchandise through the customhouse and the payment of the lowest rates of duty. The Latin-American merchant prefers to do business with a concern that is careful, attentive to details, and watchful of his interests. If invoices are prepared with care and made understandable with accurate descriptions of merchandise in Spanish, it will be found that the little extra time given to the work will be well spent.

CREDITS AND COLLECTIONS.

In Colombia business is essentially on a credit basis. Dealers in the smaller towns open current accounts with houses in the cities. To the dealer who trades outside of the country, long credits are almost a necessity. The importer is generally required to order a larger amount of supplies than can be immediately used, and because the tariff and freight charges amount to 50 to 70 per cent of the value of the goods, the outlay of money when the goods are received is often very large.

European merchants allow their customers from 3 to 12 months in which to pay. It is a common practice to grant 6 months without interest and an extension of several months with a low rate of interest. Since the local banks charge 18 to 24 per cent per annum as interest on loans, it may be readily seen that the long-time credits given by the European houses constitute one of their principal assets in retaining Colombian trade.

American manufacturers in general have not been willing to give long periods of credit, owing partly to a smaller interest in the market but mainly to the lack of facilities for collecting accounts and financing shipments. The Europeans have men of their own nationality on the ground to arrange matters and attend to collections as well as to increase trade by granting accommodations which, because of their intimate knowledge of the commercial situation, they know are safe.

For the exporter who maintains a permanent agency in Colombia from year to year and has means of knowing the varying phases of the economic situation and the character and standing of commercial firms to which he sells, the granting of credits is not a difficult problem, but to the manufacturer who is just entering the field or is carrying on business through salesmen or correspondence it is a matter that requires serious consideration.

Information with regard to the reliability of Colombian furniture importers and dealers may be obtained through credit-reporting agencies or the correspondents of American banks.

Banks in Colombia are as follows: In Bogotá—Banco de Bogotá; Banco de Colombia; Banco de Comercio; Banco Central; Banco de Piñeda, López y Cía. (forwarding agents for the interior, with offices in Barranquilla and Cartagena). In Medellin—Restrepo y Cía. In Cartagena—Banco de Bolivar; Banco de Cartagena; Banco Industrial; Pombo Hermanos. In Barranquilla—Banco Comercial de Barranquilla; Alzamora, Palacio y Cía.; Banco Dugand.

When the United States began to increase its trade with Colombia, shortly after the outbreak of the war, American manufacturers were decidedly cautious about giving credit, and rarely was more than 10 to 30 days' sight allowed. However, since the markets have developed and the customers proved reliable, terms of 60, 90, and even 120 days' sight are now common.

As the Colombian customs laws authorize the clearance of merchandise from the customhouse on presentation of the certified consular invoice, and do not require the presentation of the bills of lading for this purpose, the exporter should in every case send the bank or importer's agent the draft of acceptance, with the bills of lading and certified consular invoices attached. The house on which the draft is drawn must then accept or pay the draft in accordance with its contract with the exporter or the papers for clearance of the merchandise through the customhouse will not be released. This does not afford complete protection, however, as it is possible for the importer to secure a duplicate copy of the consular invoice at slight expense. Credit for future business is seriously injured by failure to accept or pay such a draft. In case the importer is located in one of the inland cities, the draft and other necessary documents should be sent to his forwarding agent at the port of entry and not to his city bank. This will eliminate long delays and the heavy fines that the importer would otherwise have to pay because his goods were not cleared through the customhouse within the time fixed by law.

DOMESTIC MANUFACTURING.

As a whole the manufacture of furniture in Colombia is far from a well-developed industry. Except for the addition of a very little machinery it is more or less the same as it was a hundred years ago. Aside from that made in a few meagerly equipped and poorly managed shops, which turn out an ordinary product, most of the furniture of the coastal cities is made by the local carpenters, who very roughly construct the more common articles. In Cartagena, a city of 38,000 inhabitants, there is only one shop that is equipped with any machinery for building furniture. This shop has a circular saw, a planer, and a band saw, and five cabinetmakers are employed there. In Barranquilla, a city of 50,000 inhabitants, the status of the furniture industry differs but little from that in Cartagena. There were formerly two firms manufacturing furniture in Barranquilla, but one failed recently.

As a result of the high cost of imported furniture, due to the inadequate transportation facilities, the advance in freight rates, the high tariff, and a growing home market, the furniture industry of the interior of Colombia is being forced to a higher plane of development. Since the beginning of the war, the manufacturers of the interior have increased their output threefold. In Bogota, the capital of the Republic, with a population of 120,000, and in Medellin, a city of 70,000 inhabitants, there is a market for a better product than is found in the coastal districts of the country. In each of these cities this has led to the establishment of several shops employing from 10 to 20 men continually. While the equipment of these shops is far from adequate, it is much superior to that found in any other furniture factories in the country. In Bogota some of the manufacturers have purchased a few American machines.

The product of the shops in the coastal cities consists chiefly of very cheap, ordinary case goods that can not be imported successfully. There is also some office furniture, such as desks, tables, and chairs, made of native woods, which withstand the attack of the termite (white ant). It is sold somewhat more cheaply than American products of the same type. When new, the domestic furniture has a good appearance, but, because of its being constructed of unseasoned lumber, it warps, opens, or cracks and becomes unsightly and unserviceable in a short time.

The furniture manufactured in the shops of Bogota is much superior to that of Cartagena or Barranquilla. It consists chiefly of case goods, office furniture, and plain and upholstered chairs. Inasmuch as the product is sold to a more discriminating market it is constructed and finished better than that made in the coastal cities, but, owing to the primitive methods of manufacture, the lack of cheap power, and the cost of lumber, which retails at $90 to $100 per thousand feet, the domestic furniture made in Bogota is about as expensive as that imported.

While the domestic manufacturers are able to produce only a comparatively small amount of ordinary furniture, consisting mostly of case goods, this seems to satisfy the wants of the common people, and, as a result, domestic production of this type will always compete with foreign-made furniture of similar quality.

PROTECTION OF TRADE-MARKS.

Firms using a trade-mark may be interested in knowing the requirements in Colombia for those who desire the mark recognized and protected. The mark must be registered at the office of registration, Ministerio de Agricultura y Comercio, Bogota. The registration fee is $15, and protection is granted for 20 years, after which time the registration may be renewed upon payment of $30. The Colombian law vests the right to a trade-mark in the individual who first registers it; therefore if a trade-mark is to be used in that country it is essential that it be registered immediately upon introduction.

IV. METHODS OF ENTERING MARKETS.

CORRESPONDENCE.

There are various means of entering a foreign market, and their desirability depends upon many factors. The extent of the exporter's success is limited by the effectiveness of the method he adopts.

While some manufacturers have built up a good trade in Latin America by means of correspondence and catalogues only, the success of such a plan is the exception rather than the rule. It can never be the most effective method of entering a market where foreign trade is established and competition is strong. However, this may seem to be the only available method for some manufacturers, and with the use of the native language of the customer and the right kind of catalogues properly distributed they may be able to introduce their product with some degree of success.

Correspondence with Colombian merchants should always be in Spanish. The manufacturer should make sure that he has a competent clerk who is able to translate his letters into the best idiomatic Spanish. Frequently American business letters are, in the estimation of the Latin-American recipient, too terse and even discourteous; therefore they often fail to give the impression intended.

Catalogues should be prepared with great care and, like the correspondence, should be in Spanish. The prospective customer will base his opinion of the manufacturer and his products largely upon the appearance of his printed matter. Catalogues need not always be large and expensive. A small booklet, well prepared, giving a description of the construction, durability, and other features of the articles, with good colored cuts, a statement of the cubic contents (including packing), and the exact shipping weight, will prove satisfactory. Weights and dimensions should be stated in terms of the metric system. American consuls frequently receive inquiries relative to United States products. It would undoubtedly be an advantage to have catalogues on file at the consulates. A letter giving full details of prices and discounts should accompany all such literature.

Retail prices should not appear in the catalogues sent to Colombian merchants. As freight rates to different parts of the country (especially to the more inaccessible cities) vary, the ultimate selling prices must also vary. In quoting prices f. o. b. care should be taken to make it clear whether this is on board at the factory or at the port.

Complaint has been made that American manufacturers do not put sufficient postage on catalogues and letters. Causing the recipient to pay postage is inexcusable, and care should be taken to avoid such a mistake. A polite letter to a merchant saying that a catalogue is being forwarded to him and that it is hoped he will find it interesting, thus making the advertising a personal matter, will greatly enhance the value of the literature.

EXPORT HOUSES.

To the furniture manufacturer who is not situated near a shipping port, and whose business does not warrant the expense of maintaining a direct foreign trade, the export commission house offers some assistance in entering the Colombian markets. With its representatives in the foreign field and its organization at the seaports, it is well prepared to place the manufacturer's products over a wide area and relieve him of the necessity of maintaining a costly force to carry on the detailed work connected with the export trade.

Because of the extensive business of the export commission house and its personal contact with the Colombian merchants, it is well prepared to extend the credit that is so necessary in order to obtain trade. This is a decided advantage to the manufacturer who is unprepared to sell on a credit basis; selling through the export house relieves him of the necessity of deciding terms, giving credit, and making collections.

By reason of its volume of business the export house may obtain valuable concessions in respect to freight rates and thus be able to deliver merchandise more economically than the manufacturer whose foreign business is small. When a large amount of goods is collected for shipment the expense connected with the preparation of steamship manifests and charges for handling are, as a rule, divided in such a way as greatly to reduce the cost of the individual shipments.

However, there are some disadvantages that must be considered when one contemplates using the export house as a means of carrying on foreign trade. Owing to its extensive and varied interests such an organization can not promote the sale of each manufacturer's product beyond a certain limit, and, naturally, there are cases in which no one individual's trade gets the attention essential to the building up of a big business. In addition, the export house does not endeavor to maintain an organization of men skilled in selling goods in every line it handles; thus some manufacturer loses a very valuable factor in the growth and success of his business.

Selling through an export house also places a manufacturer in a position where he must compete not only with European manufacturers but also with others in his own country, who possibly are using the same means of getting their product on the Colombian market.

NATIVE HOUSES.

A certain amount of success will be had in carrying on export trade through native houses, but in Colombia it is not the rule to maintain a store for the purpose of selling furniture exclusively. This line is handled by all general-merchandise houses; therefore it ordinarily does not receive the attention necessary to the development of a big business. The stock carried usually consists of chairs and iron and brass beds, with, very rarely, a sample of some line of office files or desks. The amount of furniture carried is necessarily limited because of the nature of the merchant's business.

It is the custom of the merchant to buy furniture on a liberal discount basis and sell it at whatever profit he is able to take. It is advisable to use the least involved system in stating discounts. Quotations should be so arranged that one discount from the price indicates the cost to the dealer.

Whenever such a course is possible it would be an advantage to both the manufacturer and the customer if prices were quoted c. i. f. European manufacturers have been able to secure much of the business because they have used this method to a large extent. When a firm gives its prices in such a way the merchant knows what goods are going to cost laid down at his port, and he is more likely to purchase them than those with prices quoted f. o. b. However, quoting prices c. i. f. involves an increased amount of detailed work on the part of the manufacturer, which must be done with the utmost care to avoid complications in shipment and undue expense to himself and his customer.

As it is the custom for a merchant to sell on a credit basis, it will be necessary for the furniture manufacturer to allow the Colombian dealer relatively long credit. If, after a careful investigation, it is found that his financial standing and business reputation are good, liberal terms should be offered. However, sales should not be made to new customers on open account. The terms of credit should be from 60 to 90 days. The custom in making collections is to send a draft of acceptance, with bills of lading and consular invoice attached, to the customer's bank. In case he is located in the interior the draft and papers should be sent to his forwarding agent on the coast.

While it may be necessary for many manufacturers to depend upon native houses to sell their products, this method will not result in an extensive foreign business.

TRAVELING REPRESENTATIVES.

The best method of entering the Colombian market is by means of traveling representatives. One reason the European manufacturers have succeeded so well is that they visit their prospective customers and, by personal contact, learn what is desired and how the buyer wants it sent. If American manufacturers are to be successful in this field it will be necessary for them to call upon the trade as do their competitors. The same representative should be sent to a market regularly. He will be able to form acquaintances, create friendships, and learn financial standings, all of which are important elements in the increase of business.

American manufacturers are now enjoying the greater part of the furniture trade in Colombia, and there is reason to believe that, if they cultivate this market diligently, almost the whole of it may be theirs.

V. MARKET FOR PARTICULAR KINDS OF FURNITURE.

HOUSE FURNITURE.

CHAIRS.

Owing to the peculiar Spanish custom of arranging the Colombian house, especially the parlor, a good market is created for cheap and medium-grade chairs. The parlor is usually furnished with from 10 to 20 straight-backed chairs placed against the walls, and in the middle are 6 to 12 rocking chairs in two rows, facing each other, with a center table between them.

Previous to the war, the most popular and universally used type of chair was that manufactured in Austria. The Vienna or bent-wood chair, as it is commonly called, has many advantages that make it attractive to the Colombians. It is light and cool, thus being very appropriate for the climate and meeting with the approval of purchasers. Because of its lightness the duty is much less on this type of chair than on any other. Not only has it these advantages, but it can be shipped knocked down, being constructed so as to be put together easily and quickly with screws. This makes it possible to pack these chairs in bundles and thus eliminate all unnecessary weight. They are wrapped in straw and paper, then sewed up in burlap, a dozen in a bundle, and generally shipped without crating or boxing.

The Austrian bent-wood chair is superior to that of either American or Spanish make, both in quality and finish, and before the war could be purchased for 60 cents less per chair than the American product. Also the Austrian plain, straight-backed chairs weighed 13 pounds less per dozen than the American chairs, which was an important consideration, since duty is charged on the gross weight. The popular color for the bent-wood chairs is dark brown or black.

The cheap American chairs, of both straight and rocker style, selling for $15 to $35 per dozen wholesale, also enjoy a good market in Colombia, especially since the war has cut off the supply of the bent-wood type from Austria. For the Tropics, such chairs should always be furnished with cane seats and finished with hard varnish, and, in order to reduce the expense of importing, and thereby gain the favor of the merchants, it will be well for American manufacturers to adopt the Austrian method of packing and shipping this grade of furniture.

In the city of Bogota, where the climate is cool, upholstered chairs and sofas are very widely used, especially by the wealthy people. Upholstered furniture was first introduced into that city by the French, and a tendency to cling to their style still exists. As a result, up to the outbreak of the war France was the principal country supplying this line of goods. The upholstering materials are leather, plush, and silk, chiefly of rather bright colors. A very small quantity of upholstered furniture is purchased from the United States. Undoubtedly this is due to the disparity between upholsterers' wages in the two countries, a difficulty that will be very hard to overcome. Much of the upholstered furniture is manufactured by the local shops, which produce an article of good quality that sells for a medium price.

Upholstered chairs with arms are more popular than those without. Their price varies from $18 to $20 per chair. Bogota is also a market for cheap dining-room and parlor chairs with solid or upholstered seats, finished in mahogany or darker colors and packed knocked down.

REED AND RATTAN FURNITURE.

There is a rapidly growing market for furniture made of reed, rattan, and similar materials. Not only is it well suited to the climate, being cool and comfortable and not affected by insects, but it has the advantage of being light, which adds to its popularity, since duty on imported furniture is charged by gross weight.

The simple, moderate-priced types which can be taken apart for shipment are preferred. The colors most desired are browns, dark greens, and grays. Very few are ordered with cushions, as open reed or cane seats are more comfortable. When cushions are ordered, care should be taken to pack them separate from the chairs, as the duty on this type of furniture is $0.20 per kilo, while if cushions are added the duty is $1 per kilo.

TABLES.

Because of the manner of furnishing the home, there is a good market for center tables. The custom is to place a table in the center of the room, and upon it to arrange a large amount of bric-a-brac and ornaments. The table top is usually round or oval and measures from 24 to 30 inches in diameter. The more ornate designs are preferred. The Colombian merchant would wish to purchase these tables in the United States at wholesale prices ranging from $5 to $15 each.

The side tables, used two in a room, are semicircular or rectangular in shape and from 20 to 30 inches in length on the longer side. They are placed beneath long, narrow mirrors hanging on opposite walls. Side tables are usually fitted with drawers and marble tops. Plate glass also may be used for the tops. These tables should wholesale to the importer at a cost varying from $5 to $10 each.

Dining and serving tables of low price can be sold in small quantities. The rectangular extension type is preferred in dining tables. Complete dining-room suites are very seldom imported.

It must be remembered that, to be proof against the moisture and insects of Colombia, tables, like all other furniture, must be made of solid hard wood. They should be packed knocked down.

METAL BEDS.

Before the war England was a strong competitor for the metal-bed trade, but owing to the lack of definite statistics it is impossible to state just what percentage was imported from that country. The war, however, has caused England to withdraw almost entirely from the field, leaving the United States the main source of supply.

The metal beds most used in the coastal districts of Colombia have been of the cheapest and the medium grades, selling at retail at $10 to $30 gold each. A common type is one in which all the principal parts, except the grille work at the head and foot, can be packed as a bundle of rods. While the most popular type of metal bed is that made of iron and finished with enamel, there is some demand for all-brass beds; however, the number of brass beds sold will always be limited by the high cost.

The American metal beds are outselling the English makes, owing to the fact that they are made of larger tubing, which gives a more substantial appearance, and yet are no more expensive. Most of the English beds sold in the coastal districts are made of small, thin tubing, which soon becomes loose at the joints.

Springs and mattresses are very seldom purchased with beds for the Tropics. Because of the hot, humid climate and the many insects, a frame of wood or metal, with a strong strip of canvas stretched over it, is preferred, as it is much cooler than a mattress. When beds are so equipped they should be made with crossbars at least 3 inches higher than those fitted with springs and mattresses.

Metal beds are ordered in both single and double styles, and the customary lengths and widths are suitable for this market. Colors vary; some light blues and pinks are used, but the all-white enamel is most desired. White frames with brass knobs and trimmings are admired, and are sold to those who can afford to pay the additional cost. As the most common single bed without springs and mattress sells for $15 to $25 gold, very few of the more ornate types find a ready market. Metal beds should be put through a rust-proofing process and have only the best grades of enamel applied. With a very moist atmosphere prevalent, an ordinary iron bedstead with poor or injured enamel soon becomes anything but an article of beauty.

In the cooler districts the market for metal beds is relatively small. This is due to the great expense of transportation and the general favor in which wooden beds are held. Some of the wealthy people are beginning to buy metal beds, usually those of very elaborate designs with highly polished brass finish, which sell for $80 to $100 and even $200 gold. English beds have been most popular in this section of the country. It is said that the American beds are not so attractive because they are less ornate in design. For interior cities, such as Bogota and Medellin, where the climate is more temperate, bedsteads should be fitted with springs unless otherwise ordered, but mattresses are made locally and very seldom purchased with the beds.

A few metal beds are made in Colombia, but the percentage is small and is not likely to increase in the near future. Beds of both foreign and domestic make are carried in stock in small quantities by practically all the general merchandise houses, which order directly from foreign manufacturing centers. Only a few are purchased through jobbing importers.

Metal cots, ordinarily reducible to four solid parts—head, foot, and side bars—also find an extensive market, as do metal cribs of simpler type.

METAL WASHSTANDS.

Washstands of metal are becoming more common and are the only kind imported to any extent. Most of those made of wood are built in the local shops for a price much lower than that for which even cheap imported ones can be purchased. Two styles of metal washstands are popular. One, with a light enameled frame, is fitted with a basin and pitcher of the same color, which is usually white, pink, or blue. The other is more elaborate, having a water tank, basin, and drain receptacle attached. Metal washstands should be subjected to a rustproofing process before the enamel is applied. Also, they should be so constructed as to occupy as little space as possible in shipping. Because of the growing popularity of metal furniture in the Tropics, with some effort on the part of manufacturers a profitable trade may be developed in this line.

WARDROBES.

In Colombia wardrobes are indispensable, as the houses are built without closets, and this article of furniture is required to provide storeroom. However, only wealthy people can afford to buy those imported, for the most common ones sell for $50 to $100. Less expensive ones of nicely figured Spanish cedar, which is not attacked by insects, can be built by the local carpenters for $30 to $50 gold.

Two styles of wardrobes are used. One is fitted with shelves the full width, and the other is divided by a perpendicular division, of which one side is fitted with shelves and the other is used for hanging space. Wardrobes may or may not be fitted with mirrors, depending upon the wishes of the purchaser. When mirrors are used they usually extend the full length of the door.

All wardrobes should be built with an open space at the base 5 inches high. This is for sanitary purposes and protection against insects. The most popular size is 5 feet wide, 7 feet high, and 20 inches deep, fitted with two doors and having two drawers at the bottom. All wardrobes should be built on the knocked-down plan for the Colombian trade.

KITCHEN EQUIPMENT.

In the homes of the upper classes the work of the kitchen is exclusively in the hands of servants, and the employers, therefore, seldom show much interest in improved devices. Very few houses have modern cook stoves, or any kind of stove other than a brick oven fitted with a charcoal burner over which the food is prepared. Seldom is one of these stoves fitted with a means by which the smoke and fumes can escape to the outside, and the kitchens, therefore, are usually stained and dingy.

Tables, food closets, and chairs, which are very crudely made by the local carpenters, take the place of the more modern American pieces. Until the employers of the servants take more interest in the preparation of food and feel a need for modern sanitary equipment, there will be no market in Colombia for kitchen cabinets, special tables, or other labor-saving devices for the housewife.

REFRIGERATORS.

Owing to the Colombian ways of living, which are unlike those in the United States, refrigerators for home use have not found a good market. The general practice of going to the market or sending a maid each morning to purchase the necessities for the day does not tend to create a demand for modern sanitary means of preserving food. Fresh meat is killed at 4 o'clock in the morning, sold at 8, and cooked at 11. No attempt is made to keep food from one day to the next, and this condition eliminates the chief need that the refrigerator supplies. Refrigerators are, however, coming into greater use in restaurants, cafés, and refreshment parlors where cold drinks are sold. When the use of ice (which now sells at 1 cent a pound and is produced in small quantities) becomes common, there will be a larger market for ice boxes. Not only the custom of the people but also the cost of the box restricts the number of refrigerators in Colombia.

Refrigerators that retail in the United States for $8 to $20 sell in Colombia for $60 to $100 gold.

The general criticism of American refrigerators is that the ice container is too small. Manufacturers should not overlook this point, which is an important one, in preparing their product for the Colombian market.

OFFICE FURNITURE.

CHARACTERISTICS OF MARKET AND TYPES COMMONLY DESIRED.

Up to the present time very little office furniture has been sold in Colombia. The lack of capital and the unfavorable transportation facilities have resulted in a slow development of the country's resources, and industry and commerce have yet to receive the impetus that will create a need for modern business methods and equipment.

The possible purchasers of office furniture are comparatively few in number and difficult to reach. With the exception of Barranquilla and Cartagena, the principal cities of the country are situated hundreds of miles inland, being accessible only after a week or more of very slow and uncomfortable travel by boat, train, or mule back. Only one of these cities has a population of more than 100,000 inhabitants. In these cities the chief market for office furniture must be found, and the manufacturer or his representative must take the long, difficult journey and spend much time to get in touch with the business men of the country.

Nothwithstanding these difficulties, some office furniture is being introduced. A few Government offices and banks have been equipped with modern business furniture, and, with considerable study and much effort on the part of American manufacturers, trade in office furniture with Colombia may be increased.

On the coast, steel office furniture is well liked and is admirably adapted to the climate. It does not warp, is very durable, and is not subject to the ravages of ants and other insects. Also, as a result of the lack of competition by local manufacturers, metal furniture has a great advantage over that of wood in all sections of the country.

All metal furniture for Colombia should be subjected to a rust-proofing process and finished in good durable enamel. Unless the metal is well protected it will soon rust through and become unsightly.

Metal trimmings, such as binders on desk tops and handles, knobs, etc., finished in bronze, brass, or nickel, tarnish in tropical climates and soon become unattractive. The nickel finish is very unsatisfactory for this reason. Some other attractive but serviceable material must be used.

The colors most used in office furniture are mahogany and dark oak. Mahogany is the first choice because it harmonizes with the interior finish of most of the buildings.

In packing metal furniture it would be well always to include a small can of enamel in order that any chipped or scarred places may be gone over, for nothing detracts from the beauty of steel furniture more than bare metal spots. Without doubt foreign customers will appreciate this consideration.

OFFICE DESKS.

The roll-top, sanitary type of office desk is the most popular in Colombia, although the flat top is often seen. The full pedestal desk is rapidly going out of use, and all the new ones are of modern design. Very few large desks are imported, but there is a fairly good trade in those of medium size and price.

Office desks, like all other furniture for this market, should be made of solid wood, never built-up and veneered. The humidity of the climate causes the veneer to loosen even on the highest-priced desk, and unless the wood is hard and solid it is subject to attacks of wood-eating insects, which destroy it even before the veneer peels off.

In Colombia there is not a good market for the manufacturer who makes nothing but medium and high priced desks of veneered wood, but for the firm that will build good cheap and medium-priced solid-wood desks, in both roller and flat-top styles of the sanitary type, there is an opportunity to establish a trade.

Steel desks of the sanitary type are greatly admired and are purchased to a relatively small extent in both flat-top and roller-top styles. They are in every way adapted to the needs of the people on the coast, but, because of their high cost, few are imported. On the plateaus the temperature is lower, and, as the offices are not heated, steel desks are not popular because of their unpleasantness to the touch when they are cold.

To compete with the domestic product, an imported wooden desk should sell for not more than $30 to $60 wholesale. Desks should be shipped knocked down, flat if possible, and packed in moisture-proof cases.

The market for folding, flat-top typewriter desks is not large, but the small folding table and the side attachment for office desks are received with favor.

FILES, SAFES, STORAGE CASES, ETC.

It can not be said that filing cabinets have been commonly used in Colombia. In fact, there were no modern files in the country until very recently. Many of the large business houses still keep their correspondence in the cardboard-box letter files that one can buy for 25 cents in the United States, and practically all of them use the copy book for keeping a record of their correspondence. A copy book is required by law. Bound ledgers, journals, and copy books must be registered at the office of the district judge before they are used. Possibly this has something to do with the restricted use of files, but the main reason may be found in the unfamiliarity with up-to-date office methods and equipment, the comparative smallness of most business, the cheapness of clerical labor, and the high initial cost of imported office furniture.

Business methods in Colombia are gradually changing, and modern ideas are being slowly adopted. There is an increasing interest in new labor-saving devices and conveniences, due to the growing commercial intimacy with the United States and to the influence of young men who return home from American schools and colleges, where they became imbued with a new conception of commercial life. Through their influence some files have been introduced, and, although it is necessary to keep a copy book to comply with the law, the files are also used because of their recognized convenience.

The two types of files that seem best adapted to the needs of Colombian business men are the regular letter and legal size files in three-drawer single sections placed on the sanitary leg base, at least 1 foot high. In many cases one legal-size and two letter-size files on a base would be preferred. As most business men do not have need for a great amount of space in any one type of file, a combination of letter and legal size with shallow sections for storing legal blanks, stationery, and printed forms would be desirable. All files should be fitted with a strong lock, and where possible the general lock should be used. In many instances the low truck base would be an attractive feature.

Steel safes, storage cases, wardrobes, and shelves are admired because of their lightness in weight and the security they offer for valuable papers, books, etc. Fireproof safes of small and medium sizes, fitted with a combination of storage shelves, roller shelves for books and stationery, and cash boxes, should find a good market. Steel storage cases, racks, and book shelves should also sell well when properly introduced. Banks, commercial houses, and lawyers ordinarily keep quantities of stationery on hand and the sanitary and protective features of such furniture should appeal to the business man who must contend with the many insects, worms, and other pests which, in tropical climates, destroy papers, books, and stationery in a remarkably short time.

The development of Colombia as a market for office furniture seems a possibility, but one requiring an educative propaganda. As a rule business houses employ a good many clerks and petty assistants, involving much expense and waste of time. It will be necessary to point out the labor-saving features of modern office equipment and its ultimate economy. It is fair to assume that business men will be moved by such arguments.

While, as a rule, business enterprises are not conducted on a scale that would warrant the expenditure of large sums for equipment, American office furniture is much admired by Colombian business men, and it would be more commonly used if the ultimate selling price could be materially reduced.

SCHOOL, CHURCH, AND THEATER FURNITURE.

Colombia has a system of public instruction in which the schools are supported by the Government, but owing to insufficient funds, lack of trained teachers, and inadequate equipment illiteracy is prevalent in even the most progressive parts of the country.

Up to the present time very few modern school seats have been purchased. The primary departments are equipped with homemade benches of very crude patterns. The schools of Bogota have an enrollment of 10,000 pupils, but use no American seats. The Government supplies rough tables and stools for the elementary sections, but the students of the secondary schools must furnish their own equipment. Antioquia, one of the more progressive States of

Colombia, has recently purchased some modern school desks. The following table will give an idea of the kind of seats bought and the prices paid:

Districts.	Desks, one person.	Desks, two persons.	Seats.	Instructors' desks.	Value.
Jerico	54		8	8	$371
Venecia		26	4	4	167
Puerto Berrio		44	6	6	369
Zaragoza	50		7	7	565
Marmilla	65		7	7	414
Santa Rosa		35	5	5	274
Antioquia	44	44	12	12	651
Ebejico	1	1			16
Remedios	20	20	4	4	269
Don Matias	1	1			16
San Pedro	4	4	2	2	71
Medellin	25	40	11	11	501
Total	264	215	66	66	3,684

Other States are beginning to feel the need of better educational facilities and are endeavoring to obtain financial assistance from the National Government. There are no local industries making modern desks at present, and Colombia should be a fair market for American manufacturers when sufficient funds are provided for better schools.

At present there is no opportunity for selling technical or laboratory equipment. There are a few industrial schools that offer instruction in several trades, but the authorities are unable to purchase modern equipment. Apparently, in many cases, homemade apparatus will have to serve for many years.

Manufacturers should address all communications to Dr. Emilio Ferrero, Minister of Public Instruction, when wishing to quote prices or send literature.

Neither the churches nor the theaters of Colombia offer a market for American seats. The churches are furnished with homemade benches that seem to satisfy the requirements of the people. As most of the theaters are of the open-air kind, chairs or benches, other than the rougher type made by the local carpenters, would be unserviceable. The National Theater in Bogota is furnished with imported seats, but motion-picture houses are fitted only with common wooden benches. The Olympic, which has a seating capacity of 3,500 people, is seated with locally made benches.

Bent-wire chairs and tables for restaurants, cafés, and refreshment parlors are popular, and, owing to the facility with which they may be packed and shipped, they should find a large market. The tops of tables should be of white enameled metal, marble, porcelain, or similar material, and the chair seats of solid and not veneered wood. All metal parts should be subjected to a rust-proofing process.

VI. SUMMARY.

Colombia is not a ready and accessible market for furniture. The climatic and economic conditions of the country limit the needs and buying power of the people. While it is true that the furniture trade is gradually increasing, it must be remembered that, of the

5,000,000 inhabitants, not more than 10 per cent can buy imported furniture to any considerable extent.

To the manufacturers of fine veneered furniture the tropical sections of Colombia offer no market, and, because of the difficulties of transportation and the competition of domestic makers, there is no prospect for extensive trade on the plateaus. However, there is a demand for metal beds, cheap chairs, and wicker furniture.

The sale of office furniture is slowly improving. Modern business methods and conveniences are just now beginning to be used in Colombia, and there is evidence that interest in up-to-date office equipment is increasing. Notwithstanding the need of and interest in this line, the market can not be developed without well-directed effort on the part of the manufacturers.

There is no element in connection with the Colombian furniture trade that needs more careful attention than the subject of packing. As goods are carried by boats, trains, mules, and men, are exposed to tropical rains and sun, and are transshipped no fewer than six times between the coast and some of the interior cities, it may be readily seen that the size, weight, and covering of packages need special attention. It is also necessary for American manufacturers to extend reasonable credit and to give to foreign trade a consideration consistent with their domestic service, if they are to secure and hold this market.

NOTE.—In connection with the foregoing report, Special Agent Everley submitted a list of firms selling furniture in Colombia (mostly general-merchandise houses), and this may be obtained from the Bureau of Foreign and Domestic Commerce or its district or cooperative offices by referring to file No. 1258.

Mr. Everley also sent in a catalogue of "Mundus," United Austrian Bentwood Furniture Manufacturers (Ltd.), of Vienna, containing a comprehensive account, in six languages, of the great variety of furniture made and sold by this important organization. This publication may be examined by interested persons upon application to the Bureau or any of its district offices, the file number being the same as that mentioned above.

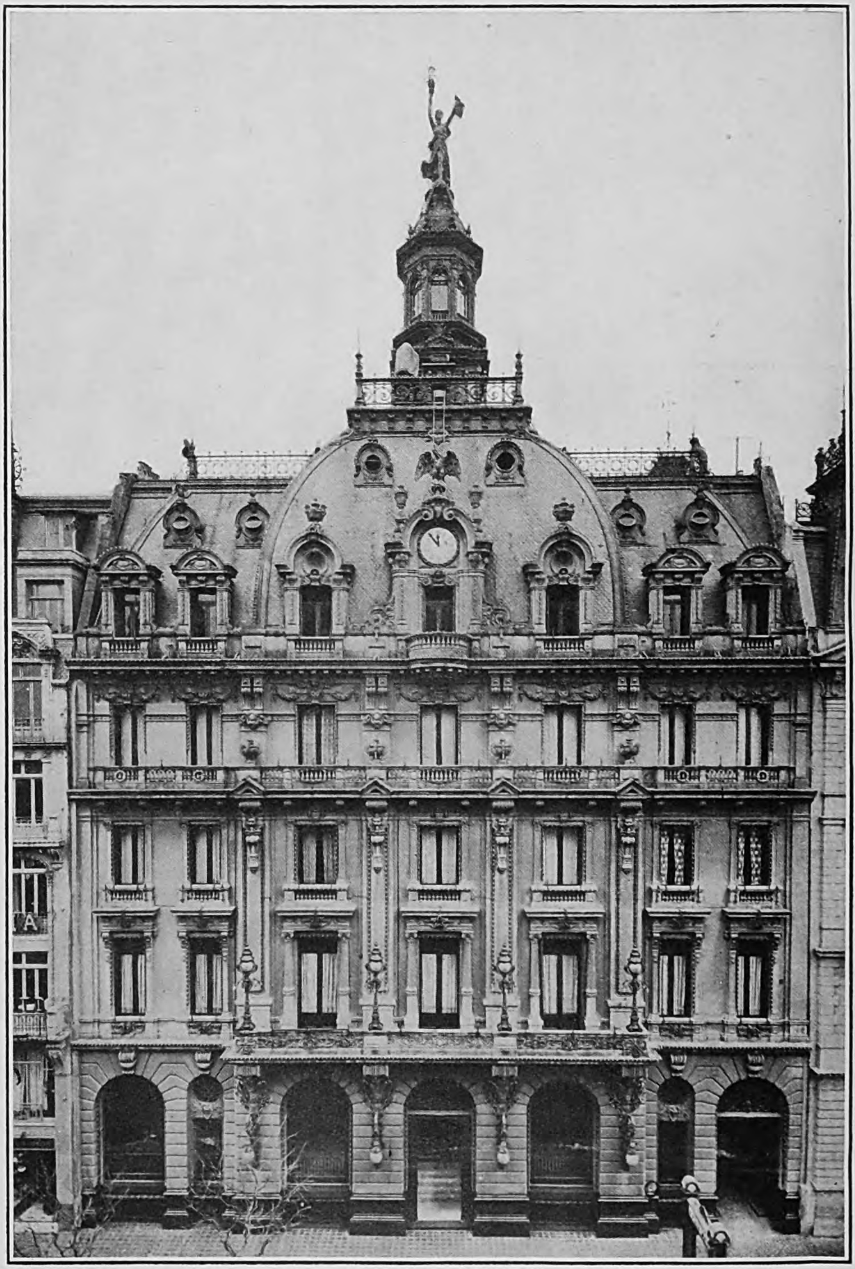

FIG. 1.—BUILDING OF LA PRENSA, BUENOS AIRES.

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LETTER OF SUBMITTAL.

DEPARTMENT OF COMMERCE,
BUREAU OF FOREIGN AND DOMESTIC COMMERCE,
Washington, February 20, 1918.

SIR: There is submitted herewith a report by Special Agent Robert S. Barrett, now United States commercial attaché at Buenos Aires, Argentina, on the markets for American paper, paper products, and printing machinery in Argentina, Uruguay, and Paraguay. Three monographs by Mr. Barrett have already been issued, covering Cuba and Panama, Peru, Bolivia, and Ecuador, and the Republic of Chile. The River Plate countries, discussed in the present volume, constitute the most important field in South America for the sale of the articles included in the scope of this investigation. Argentina consumes from $15,000,000 to $20,000,000 worth of such goods per annum, and the other two countries about $1,000,000 worth. This region is rich, enlightened, and progressive, with a future of boundless potentialities. It is highly desirable, therefore, that American manufacturers of paper and printing equipment should make a vigorous, determined effort to establish a secure position for themselves in the markets of the Plate, particularly at such a favorable time as the present.

Supplementing Mr. Barrett's discussion of the market are details as to the equipment of publications, printing offices, paper factories, etc., as found at the time of his investigation in these countries.

Respectfully,
B. S. CUTLER,
Chief of Bureau.

TO HON. WILLIAM C. REDFIELD,
Secretary of Commerce.

PAPER, PAPER PRODUCTS, AND PRINTING MACHINERY IN ARGENTINA, URUGUAY, AND PARAGUAY.

ARGENTINA.

INTRODUCTION: DESCRIPTION OF COUNTRY.

The Republic of Argentina, second in area and population of the South American countries, occupies the southeastern part of the continent. It is a triangular country lying between the Andes on the west and the Atlantic Ocean and River Plate on the east. Southward it extends to the region where the waters of the Pacific and Atlantic join. The country is about 2,400 miles long from north to south and has an average width of about 700 miles. Within its area of a million and a quarter square miles could be placed Germany, France, England, Ireland, Switzerland, and Italy, with sufficient space remaining to form several American States. The greater part of the country is a level plain with rich soil, largely devoted to agricultural and pastoral industries. In the mountains on the western border are undeveloped mineral resources. Manufacturing is still in its infancy, and it is doubtful whether it will ever reach a point where it will have much greater effect upon the consumption of paper than at present. Coal has not yet been discovered, and the available water power is far from the centers of population. Nearly all of the activities of Argentina have to do with the products of the soil, and the vast volume of grain and of cattle and sheep products that pours annually through its channels of trade is the sole factor that has lifted it to a place of commercial importance among the nations of the world. With the increase in the area under cultivation and the value of all food products, Argentina will grow in wealth and its people will be able to buy larger quantities of imported goods than at present.

In 1916 the population was given as 8,066,000, and this number is largely composed of foreign-born persons or the descendants of those who have settled in the country since the days of the Spanish adventurers. The total number of immigrants arriving in the Republic from 1857 to 1914, inclusive, was 4,665,710. Many of these immigrants returned again to Europe, but the constant influx of foreigners has left a deep impression upon the population of the nation. Of the total number of arrivals during the period mentioned, 2,283,705 were Italians, 1,472,604 were Spaniards, and the others were distributed among all the nationalities of Europe. The large immigration, especially from southern Europe, has had an important influence upon the printing industry. Not only have European machinery and methods been introduced, but the artistic temperament of the Latin race has permeated the establishments devoted to the graphic arts. In lithography, especially, the influence of Italian and Spanish masters is clearly apparent. More than 50 per cent of the population is urban, and 80 per cent lives within a circle drawn with a radius of 400 miles from Buenos Aires.

The interest of the American exporter naturally centers in Buenos Aires, because of the commanding position it occupies in Argentine commerce. It is the center of Argentine culture and learning, the converging point of all the railways of the country, the seat of great banks and importing houses, the place where every form of financial and commercial activity is initiated. With a population of a million and a half, it is the fourth largest city in the New World and second only to Paris as a Latin center. It is a new and modern city situated on the River Plate about 140 miles north and west of the mouth. While it is not an ocean port, ships drawing less than 26 feet of water can safely reach its extensive basins and docks. Buenos Aires is one of the world's greatest markets for the sale of paper and paper products. Not only is it the distributing point for all of Argentina, but a large part of the paper consumed in Uruguay and Paraguay is purchased from its dealers. In the Government and private warehouses along the river front are stored millions of dollars' worth of paper ready to be dispatched to consumers in the Republic and neighboring countries. Buenos Aires, by reason of its commercial importance, is in itself a very large market for paper. Its many newspapers and magazines, its large printing and lithographing establishments, and the great number of stationers require the carrying of enormous stocks.

Rosario, the second city of the Republic, is an active commercial city of 220,000 inhabitants situated on the Parana River, 129 miles north of Buenos Aires. Fast express trains make the run from the capital in four hours. Several of the large wholesale paper and printers' supply houses have branches there which in normal times are stocked from Europe or the United States. Since the war Rosario consumers have been supplied from the Buenos Aires warehouses. Rosario has several important newspapers and a number of large printing and lithographing establishments. Four of the latter are direct importers of paper and the others purchase their supplies from Buenos Aires or local dealers.

Aside from Buenos Aires and Rosario there are six cities that are important to the Buenos Aires dealers but of little interest to the American manufacturer or exporter. These are: Bahia Blanca, a rapidly-growing port, 450 miles south of Buenos Aires, with a population of 70,000; Cordoba, a fine old city of some 135,000 inhabitants, 432 miles northwest of the capital; La Plata, the capital of the Province of Buenos Aires and an hour's ride from the city of the same name; Santa Fe, a port on the Parana River, 298 miles north of Buenos Aires, with a population of 80,000; Tucuman, the most important of the cities in the northern part of the Republic, with a population of 100,000; and Mendoza, halfway between Buenos Aires and Santiago, Chile, on the transcontinental line, with a population of 59,000. Each of these cities has four or more daily newspapers, and La Plata has 12. They each have several large printing establishments and a number of stationery stores but no wholesale paper houses. Large printers and stationers buy from the Buenos Aires jobbers and, in turn, sell to their small competitors.

FOREIGN TRADE.

In 1913, when Argentina's foreign trade reached the highest figure in the history of the country, imports were valued at $406,605,203 and exports at $466,581,887. In 1914 both imports and exports decreased a third. The year 1915 showed a still further decrease in imports, but exports were greater than in 1913. In 1916 imports were valued at $209,799,995 and exports at $526,258,734. Imports for the past three years are undervalued by reason of the method used by the Argentine Government in computing statistics. Fixed values, which were adopted in 1906, were used and these are much lower than the actual value of the imports. The statistical department estimates that in 1916 the undervaluation was 68.4 per cent.

The war has made great changes in the standing of the nations that supply Argentina with its imported commodities. For many years the United Kingdom was first, Germany second, and the United States third, but in 1916 the United States took first place. The percentages of Argentine imports received from specified countries during 1913 and 1916 are as follows:

1913—United Kingdom, 31.1; Germany, 16.9; United States, 14.7; France, 9; Italy, 8.3; Belgium, 5.2; Spain, 2.9; Brazil, 2.2; the Netherlands, 1.1.

1916—United States, 29.2; United Kingdom, 28.2; Italy, 9.8; France, 6.9; Spain, 6.2; Brazil, 5.5.

PRESENT BUSINESS CONDITIONS.

Business conditions in Argentina at the time of the writing of this report (July, 1917) may be termed uncertain. Much of the financial uneasiness that was manifested at the beginning of the war has disappeared and operations, while restricted, are being conducted on a sound basis. Disquieting factors are the lack of transportation facilities, high freight rates, the rising cost of living, and the internal financial problems that the new Government has to solve. Indications are that the coming harvest will be abundant, and the prevailing high prices for all food products should give the country greater purchasing power than ever before. Very little foreign money is coming in for investment, and Government improvements are at a standstill. Values of real estate have not recovered from the slump of 1912 and 1913. Very little improvement in the purchase of imported goods can be expected until prices are lower and shipping is more abundant. Merchants are confining their purchases to actual necessities.

EDUCATIONAL PROGRESS.

There are fewer illiterates per 1,000 population in Argentina than in any other country in South America. Official statistics for 1914 show that 616 out of every 1,000 persons over 6 years of age were able to read. In 1869 the number was 217. The further reduction of illiteracy will have an important effect upon the future sales of paper, and the school statistics show that excellent progress is being made to this end. In 1915 there were 7,810 primary schools, with 27,363 teachers and 927,729 pupils; 108 secondary and normal schools, with 45,642 students; 140 special institutes, with 30,975 students; and 5 universities, with 7,574 students.

STATISTICS OF IMPORTS.

The consumption of paper and paper products in Argentina varies from $15,000,000 to $20,000,000 per annum, according to price, freight rates, and business conditions in the country. In 1916, when abnormal prices prevailed, the consumption may be roughly valued at $19,604,942, divided as follows: Wrapping paper, cardboard, news print, writing, and printing paper, produced by local mills, 28,750 tons, at $250 per ton, $7,187,000; imported news print, writing, printing, blotting, tissue, wall, toilet paper, etc., $8,902,218; imported manufactured articles of paper, including books and printed matter, $3,516,724; total, $19,604,942.

The value of the imports is reached by adding to the published statistics the difference between the arbitrary value used in their compilation and the actual value of the merchandise. Values used for statistical purposes were fixed in 1906 and no longer represent present values. For instance, news print is valued at 6 cents Argentine gold per kilo ($0.0263 per pound), while the factory selling price in 1916 was above $0.04 per pound. The Argentine Government estimates that in its statistics for 1916 the imported paper and paper products were undervalued 71.6 per cent.

The following statistics of imports are valuable in showing the relative importance of the countries that supplied Argentina with its paper. The values stated for 1913 and 1914 approach more or less the actual value of the imports for those years, but those for 1915 are underestimated.

Articles and principal countries of origin.	1913	1914	1915
News print:			
Belgium	....	$2,220	....
Canada	$1,497	4,020	$16,693
France	1,639	2,949	2,826
Germany	613,263	407,522	130,714
Great Britain	12,958	2,511	5,451
Italy	740	592	31,727
Netherlands	9,412	15,809	2,232
Norway	257,454	135,567	191,837
Spain	....	1,610	....
Sweden	241,859	316,086	249,539
United States	639,170	494,707	845,223
Other countries	2,396	1,362	2,222
Total	1,780,388	1,384,955	1,481,464
Printing paper:			
Austria-Hungary	38,580	27,828	8,144
Belgium	5,339	4,028	657
France	10,087	9,652	5,286
Germany	1,005,410	632,845	188,965
Great Britain	73,299	43,234	48,954
Italy	21,136	10,686	27,327
Netherlands	16,182	17,806	54,179
Norway	4,338	1,808	24,931
Russia	5,193	....	....
Spain	14,399	1,842	15,968
Sweden	8,367	5,954	13,340
Switzerland	....	....	2,821
United States	9,957	15,043	139,037
Other countries	....	2,432	....
Total	1,212,287	773,158	529,609
Writing paper:			
Austria-Hungary	23,753	7,302	1,752
Belgium	4,913	3,305	496
France	9,729	9,698	3,732
Germany	232,386	204,434	31,204
Great Britain	55,782	44,978	59,604
Italy	94,692	70,433	85,938

Articles and principal countries of origin.	1913	1914	1915
Writing paper—Continued.			
Netherlands	$36,111	$26,429	$12,687
Norway	136	....	3,988
Spain	45,352	38,913	35,376
Sweden	5,660	3,297	3,582
Switzerland	1,455	944	....
United States	14,924	15,450	35,918
Other countries	3	11	69
Total	524,896	425,194	274,346
Wrapping paper:			
Austria-Hungary	1,061	....	....
Belgium	9,570	4,726	1,116
France	10,336	5,147	4,492
Germany	38,956	22,119	3,668
Great Britain	9,421	9,444	7,620
Italy	4,596	4,222	5,971
Netherlands	3,396	2,698	7,520
Norway	4,293	717	6,235
Spain	341	89	530
Sweden	12,367	16,903	12,140
United States	2,293	1,595	10,918
Other countries	365	285	794
Total	96,995	67,945	61,004
Cigarette paper:			
Austria-Hungary	9,359	6,494	3,202
Belgium	18,550	13,171	6,595
France	88,920	150,217	99,051
Germany	66,354	32,318	13,995
Great Britain	1,029	1,677	2,520
Italy	2,485	331	7,433
Netherlands	5,448	2,728	9,624
Spain	26,484	34,358	114,966
Sweden	....	....	2,986
United States	2	251	4
Other countries	3,515	865	164
Total	222,146	242,410	260,540
Drawing paper:			
Belgium	209	....	....
France	5,556	3,694	3,675
Germany	3,173	2,210	448
Great Britain	1,002	1,917	3,375
Italy	6,843	4,899	6,057
Switzerland	....	....	3,912
United States	10	8	16
Total	16,793	12,728	17,483
Ordinary cardboard:			
Austria-Hungary	76,916	50,057	4,217
Belgium	7,306	10,450	897
France	9,065	4,501	9,714
Germany	290,718	253,397	39,599
Great Britain	12,484	12,803	18,020
Italy	9,187	7,369	13,311
Netherlands	78,543	48,329	126,802
Norway	5,341	7,427	25,255
Spain	....	135	11,481
Sweden	68,878	39,222	111,170
Russia	22,832	9,295	388
Switzerland	1,048	....	3,571
United States	8,948	4,445	34,462
Other countries	....	1,108	....
Total	591,266	448,538	399,487
Bristol board:			
Austria-Hungary	6,540	433	....
Belgium	1,716	2,155	1,305
France	3,010	2,566	379
Germany	115,907	59,856	21,838
Great Britain	3,784	3,656	4,844
Italy	9,209	11,099	5,842
Netherlands	970	5,959	9,863
Norway	....	612	621
Spain	18,375	14,536	8,003
Sweden	....	....	1,384
United States	2,848	3,180	11,148
Other countries	95	82	500
Total	162,454	104,134	65,727

Articles and principal countries of origin.	1913	1914	1915
Blotting paper:			
Belgium	$6,366	$2,652	....
France	5,142	3,269	$304
Germany	8,028	5,156	1,959
Great Britain	14,182	11,601	7,589
Italy	2,579	905	1,433
Netherlands	711	792	51
Sweden	322	366	....
United States	46,004	31,578	48,907
Other countries	55	3	74
Total	83,389	56,322	60,317
Tissue paper:			
Austria-Hungary	2,275	1,401	29
Belgium	1,569	....	....
France	8,838	2,819	1,355
Germany	47,081	26,673	6,985
Great Britain	4,043	4,232	3,979
Italy	6,596	8,023	9,140
Netherlands	739	758	5,317
Norway	1,902	1,176	1,602
Spain	1,802	2,281	5,360
Sweden	20,086	6,620	26,930
Switzerland	....	....	2,304
United States	1,725	423	2,442
Japan	8,299	703	....
Other countries	300	....	....
Total	105,255	55,109	65,443
Paper in rolls for telegraphic instruments, cash registers, etc.:			
Belgium	15	....	....
France	777	1,004	....
Germany	449	113	215
Great Britain	4,784	4,399	3,192
United States	7,016	9,443	13,415
Other countries	....	215	33
Total	13,041	15,174	16,855
Envelopes:			
Austria-Hungary	1,542	2,219	....
Belgium	8,621	4,991	2,114
France	8,690	7,825	5,728
Germany	123,822	74,761	26,276
Great Britain	33,596	23,136	17,930
Italy	45,169	26,825	27,138
Netherlands	3,257	6,499	2,108
Norway	974	519	583
Spain	952	1,067	1,054
Sweden	....	....	72
United States	5,232	2,879	5,855
Other countries	96	1,079	38
Total	231,951	151,800	88,896
Printed books:			
Belgium	7,845	2,237	42
France	154,276	120,095	56,295
Germany	67,409	73,784	13,941
Great Britain	100,731	89,095	71,794
Italy	310,824	169,162	102,795
Netherlands	440	997	12,281
Norway	....	....	648
Spain	474,846	405,885	290,140
Sweden	17	....	199
United States	41,757	54,040	38,603
Other countries	11,637	9,630	4,547
Total	1,169,782	924,925	591,285
Blank books:			
Belgium	7,232	87	....
France	12,277	9,027	8,843
Germany	172,883	127,223	14,812
Great Britain	49,937	36,184	32,589
Italy	122,535	51,356	52,820
Netherlands	168	226	118
Spain	1,220	1,328	5,887
United States	7,145	5,062	6,623
Other countries	247	200	541
Total	373,644	230,693	122,233

Articles and principal countries of origin.	1913	1914	1915
Printed matter:			
Austria-Hungary	$668	$164	
Belgium	43,264	24,272	$4,129
France	90,834	69,902	49,612
Germany	166,634	88,654	16,637
Great Britain	558,784	707,448	417,428
Italy	43,937	41,008	27,830
Japan	4,604		2,177
Netherlands	1,393	8,540	2,696
Spain	10,284	7,757	6,965
Sweden	626	176	167
United States	58,443	64,390	50,388
Other countries	1,987	4,300	2,088
Total	981,458	1,016,611	580,117
Toilet paper:			
Austria-Hungary	345	927	
Belgium	1,820	455	36
France	7,746	6,160	4,650
Germany	26,506	26,904	3,339
Great Britain	12,310	12,642	11,398
Italy	76		1,276
Netherlands		793	550
Norway	203		
Spain	115		122
Sweden	203	420	1,802
United States	16,241	17,596	43,484
Other countries	64	53	
Total	65,629	65,950	66,657
Printed music:			
Belgium		152	
France	3,203	1,772	874
Germany	22,341	13,322	3,326
Great Britain	596	3,233	550
Italy	5,363	5,089	3,710
Netherlands			91
Spain	131	236	2
United States	1,171	1,684	6,005
Other countries	70		
Total	32,875	25,488	14,558
Playing cards:			
France	7,238	1,901	888
Germany	29	68	125
Great Britain	1,100	1,467	
Italy		1,206	483
Spain	12,304	5,790	7,140
United States	7,459	5,529	6,765
Total	28,130	15,961	15,401
Calendars:			
Belgium	939		
France	4,679	1,948	
Germany	4,159	6,187	64
Great Britain	9,747	1,777	2,373
Italy	1,811	7,030	575
Netherlands			358
Spain	116	88	32
United States	306	227	1,162
Total	21,757	17,257	4,564
Paper collars and cuffs:			
Belgium	98		
France	610	802	938
Germany	96,404	65,316	33,345
Great Britain			1,086
Italy	1,053		
Switzerland		8,506	11,291
United States			390
Other countries		920	195
Total	98,165	75,544	47,245
Paper sacks:			
Belgium	923	687	
France	10,808	10,320	3,892
Germany	29,004	15,290	5,409
Great Britain	18,157	10,290	4,548
Italy	1,977	3,460	6,257

Articles and principal countries of origin.	1913	1914	1915
Paper sacks—Continued.			
Netherlands	$612	$1,410	$532
Spain	14	66	71
United States	196	1,404	952
Other countries		963	25
Total	61,691	43,890	21,686
Carbon paper:			
Belgium	89	61	
France	1,857	3,353	65
Germany	3,652	3,508	407
Great Britain	37,235	29,118	20,057
Netherlands		108	64
United States	10,252	10,537	13,210
Other countries	470		162
Total	53,555	46,685	33,965
Sandpaper:			
Austria-Hungary	575	76	532
Belgium	343		
France	227	69	22
Germany	9,572	5,252	319
Great Britain	1,618	1,556	1,306
Italy	421	373	1,488
Netherlands	713		438
Spain	7,928	7,438	4,372
Sweden	126		
United States	13,109	6,352	9,177
Total	34,632	21,116	17,654
Fly paper:			
Germany	392		
Great Britain		7	818
United States	5,094	3,214	4,954
Other countries		6	16
Total	5,486	3,227	5,788
Blue-print paper:			
France	885	651	148
Germany	14,128	4,243	1,670
Great Britain	4,188	3,653	4,722
Italy			1,402
Netherlands	134	107	
United States	294	1	552
Other countries	17		175
Total	19,646	8,655	8,669
Filter paper:			
France	3,299	2,359	2,653
Germany	1,803	1,426	71
Great Britain	46	44	
Italy	442	16	169
United States	24		195
Other countries	22	1	10
Total	5,636	3,846	3,098
Photographic paper:			
Belgium	5,093		
France	6,099	3,485	502
Germany	59,440	33,868	13,610
Great Britain	44,676	26,586	16,357
Italy	1,068	1,884	706
Netherlands		1,612	5,623
Sweden			5,852
United States	34,916	26,284	67,895
Other countries	284		1,208
Total	151,576	93,719	111,753
Photographic postal cards:			
Germany		2,154	519
Great Britain			124
Italy		4	1,071
United States		40	3,437
Other countries		145	239
Total		2,343	5,390

Articles and principal countries of origin.	1913	1914	1915
Tracing paper:			
Belgium	....	124	....
France	$3,919	$1,620	$1,644
Germany	12,244	2,892	737
Great Britain	2,034	934	509
Italy	6	69	1,176
Spain	1,111	495	446
United States	30	222	269
Total	19,344	6,356	4,781
Paper boxes:			
Austria-Hungary	1,960	2,280	....
Belgium	254	674	....
France	16,778	14,053	6,120
Germany	54,554	28,608	5,464
Great Britain	11,267	9,440	4,715
Italy	6,221	1,434	4,016
Netherlands	102	....	366
Spain	975	982	1,550
Sweden	362	88	592
United States	5,166	2,864	7,088
Other countries	234	371	295
Total	97,873	60,794	30,206
Cardboard for shoes:			
Austria-Hungary	78	43	....
Belgium	299	359	....
France	376	296	39
Germany	3,983	1,762	274
Great Britain	3,543	1,178	1,146
Italy	332	264	56
United States	1,596	256	554
Other countries	454	....	41
Total	10,661	4,158	2,110
Composition books:			
France	1,023	1,609	596
Germany	439	37	....
Spain	1,091	3,763	3,426
United States	846	1,543	483
Other countries	32	69	....
Total	3,431	7,021	4,505
Labels:			
Belgium	941	392	....
France	14,831	6,750	3,157
Germany	11,980	6,676	902
Great Britain	15,439	9,911	17,534
Italy	4,404	2,066	2,832
Netherlands	100	167	149
Spain	2,013	352	296
Switzerland	44	5,257	127
United States	15,922	16,079	12,184
Other countries	208	166	192
Total	65,882	47,816	37,373
Paper lanterns:			
France	1,075	360	493
Germany	325	258	19
Other countries	163	44	26
Total	1,563	662	538
Papeteries:			
France	1,233	1,675	573
Germany	3,223	2,985	292
Great Britain	313	581	1,616
Italy	309	669	216
Netherlands	....	60	1,390
United States	1,261	68	2,628
Other countries	193	162	44
Total	6,532	6,200	6,759
Maps, engravings, etc.:			
Belgium	597	10	....
France	10,827	4,020	2,391
Germany	76,527	15,476	3,483

Articles and principal countries of origin.	1913	1914	1915
Maps, engravings, etc.—Continued.			
Great Britain	$29,413	$9,545	$6,714
Italy	12,365	5,903	7,487
Spain	1,133	188	234
Switzerland	1,951	1,652	3,092
United States	5,301	2,438	3,273
Other countries	27	110	112
Total	138,141	39,342	26,786
Paper napkins:			
China	....	240	301
France	....	162	575
Germany	830	398	....
Great Britain	....	729	16
Japan	5,736	7,971	8,212
United States	20	....	30
Other countries	81	....	....
Total	6,667	9,500	9,134
Visiting cards:			
Belgium	168	199	12
France	1,448	32	....
Germany	10,966	2,684	966
Great Britain	763	765	249
Italy	1,797	1,508	2,192
Netherlands	....	627	40
United States	523	277	587
Other countries	41	....	104
Total	15,706	6,092	4,150
Photograph mounts:			
Belgium	328	....	....
Germany	1,982	1,759	....
Great Britain	102	....	....
Italy	8	106	....
Spain	263	....	....
United States	....	4	424
Total	2,683	1,869	424
Postal cards:			
Austria-Hungary	438	....	....
Belgium	1,005	....	....
France	2,768	1,197	108
Germany	67,705	20,252	5,518
Great Britain	408	1,419	215
Italy	8,597	2,086	5,096
Netherlands	32	317	1,433
Spain	154	....	383
Switzerland	566	....	1,802
United States	404	178	1,096
Other countries	....	215	15
Total	82,077	25,664	15,666
Albums:			
Belgium	162	....	....
France	596	146	17
Germany	4,434	3,508	628
Great Britain	1,458	385	197
Italy	....	202	12
United States	39	85	519
Other countries	69	10	105
Total	6,758	4,336	1,478
Wall paper:			
Austria-Hungary	5,221	2,161	....
Belgium	47,657	8,795	2,607
France	46,913	20,510	22,485
Germany	101,683	54,013	18,936
Great Britain	44,394	20,718	86,904
Italy	283	914	2,972
Netherlands	620	....	890
Sweden	4,813	3,223	22,388
Switzerland	....	....	3,114
United States	1,704	3,236	14,519
Other countries	166	666	669
Total	253,454	114,236	175,484

Articles and principal countries of origin.	1913	1914	1915
Paper for other uses:			
Austria-Hungary	$7,172	$682	$7,738
Belgium	39,931	26,180	4,563
France	16,152	28,872	7,286
Germany	137,812	89,322	20,567
Great Britain	44,440	39,517	30,563
Italy	19,737	6,320	13,669
Japan	34,888	10,410	14,944
Netherlands	38,237	952	7,454
Norway	455	100	....
Spain	8,070	5,385	336
Sweden	11,623	3,611	1,719
United States	12,332	13,014	28,124
Other countries	1,572	626	1,275
Total	372,421	224,991	138,238
Manufactures of paper:			
Belgium	4,843	23,106	....
France	7,572	3,988	2,414
Germany	135,709	114,529	65,559
Great Britain	15,070	5,190	3,196
Italy	8,867	8,359	27,029
Japan	1,470	455	326
Netherlands	1,251	14	2,628
Spain	513	946	1,669
United States	7,494	7,905	14,248
Other countries	149	753	3,104
Total	182,938	165,245	120,173
Manufactures of cardboard:			
Austria-Hungary	1,472	1,362	612
Belgium	2,385	1,292	....
France	16,996	7,349	8,091
Germany	89,509	63,733	11,830
Great Britain	22,519	16,566	10,029
Italy	3,958	1,174	4,668
Netherlands	100	2,895	265
Spain	397	435	740
Sweden	1,739	77	920
United States	5,529	8,120	32,887
Other countries	158	513	381
Total	144,762	103,516	70,423

Figures showing the imports by countries of origin during 1916 are not yet available, but the following table shows the total imports in the several classes for that year. The values, however, are underestimated:

Articles.	Value, 1916.	Articles.	Value, 1916.	Articles.	Value 1916.
News print	$1,711,959	Calendars	$2,407	Serpentinas and confetti	$100,855
Printing paper	827,899	Paper collars	8,089	Paper napkins	5,960
Writing paper	404,183	Paper sacks	15,948	Caps for cartridges	19,645
Wrapping paper	74,839	Carbon paper	43,666	Visiting cards	5,697
Cigarette paper	267,247	Sandpaper	21,382	Photograph mounts	1,107
Drawing paper	14,452	Fly paper	6,335	Postal cards	20,637
Cardboard	710,537	Blue-print paper	6,462	Photograph postal cards	1,349
Bristol board	123,674	Filter paper	6,408	Albums	1,613
Blotting paper	77,253	Photographic paper	123,974	Wall paper	180,060
Toilet paper	97,280	Tracing paper	5,630	Paper for other uses	208,826
Tissue paper	75,068	Cardboard boxes	29,314	Manufactures of paper	24,470
Paper in rolls for telegraph or indicators	13,008	Cardboard for shoes	6,059	Manufactures of cardboard	60,090
Envelopes	55,140	Composition books	3,014	Total	6,983,846
Printed books	594,913	Labels	43,593		
Blank books	108,709	Paper lanterns	378		
Printed matter	796,692	Papeteries	3,802		
Music	16,578	Lithographs, maps, etc	40,873		
Playing cards	16,772				

The value of the paper and paper products of all classes supplied by the various countries during 1913, 1914, and 1915 is shown in the following table:

Countries.	1913	1914	1915
Austria-Hungary	$180,863	$104,337	$26,229
Belgium	230,304	136,806	24,569
Canada	2,063	4,033	17,219
France	608,250	527,827	321,917
Germany	3,933,888	2,597,491	708,642
Great Britain	1,256,701	1,203,609	932,439
Italy	759,623	457,047	493,320
Japan	55,606	22,971	25,913
Netherlands	198,672	147,185	267,988
Norway	275,095	148,018	258,786
Russia	29,378	10,211	388
Spain	630,610	536,362	516,800
Sweden	377,101	396,144	451,983
Switzerland	9,228	27,281	39,667
United States	992,701	831,651	1,520,053
Other countries	15,333	10,207	13,549
Total	9,555,416	7,161,180	5,619,462

In the statistics for 1913 and 1914 Germany is credited with more than half of all the paper imported by Argentina, but only a portion of the paper was actually manufactured in that country. As is well known, Hamburg was the world's greatest port for the exportation of paper previous to the war. Not only German but large English firms purchased stocks of paper in Norway, Sweden, Holland, Italy, France, and Spain and assembled them in Hamburg ready to be shipped to any part of the world.

METHODS OF PURCHASING.

Imported paper used in the graphic arts in Argentina is received through three principal sources—(1) from local jobbers who carry stocks in Buenos Aires; (2) on direct orders placed with foreign mills or through foreign freight or local commission houses; and (3) on direct orders placed through representatives of foreign paper-exporting houses. Jobbers purchase their stocks through either of the two last-mentioned sources.

Paper jobbing in Argentina has undergone a marked change since the beginning of the war. Previous to 1914 the greater part of the business was done by three houses—two German (Curt Berger & Co. and Hoffmann & Stocker) and one English (Gilchrist & Co.). One of the German firms is said to have sold more than two and a half million dollars' worth of paper in 1913, and the sales of the other two concerns are considered to have been well over the million dollar mark. In 1914 the local branch of an American ink factory opened a paper department and since that time has done a very large business. In 1915 another American house began business on a very large scale and in 1916 its sales reached a most gratifying figure. The German concerns have been seriously affected by the war. As both are on the British statutory list they have had difficulty in obtaining paper from abroad and have had to limit their sales largely to domestic paper. Italian and French printers and stationers, who were formerly their best customers, will no longer buy from them, and even the native Argentinians prefer to deal with other concerns.

In addition to these large dealers there are five other concerns—one Italian (Serra Hermanos), two Argentine (José Iturrat and Angel Estrada & Co.), and two Scandinavian (the Overseas Export Co. and the H. Plaut Trading Co.)—whose annual sales are in excess of $500,000 each, and a dozen or more smaller dealers whose annual turnover is from $100,000 to $250,000.

News print in rolls is sold by only three dealers. One of these firms (Wassermann & Co.) represents the largest manufacturer of news print in the United States and carries a large stock of paper in its Buenos Aires warehouse from which it makes daily deliveries to the newspapers. Another (Serra Hermanos) carries a stock of Scandinavian paper, and the third (the National Paper & Type Co.) handles American and Canadian paper.

The jobbing business in Argentina requires a large capital investment. In order to do a business of a million dollars a year it is necessary to carry in stock paper valued at $500,000 and have a like amount either in process of manufacture or en route from the mill to Buenos Aires, and to grant the credits of five months and even longer that are customary in Argentina another half million dollars will be found necessary. Expenses are much greater in Buenos Aires than in cities of similar size in the United States. To secure suitable buildings for showrooms and warehouses large expenditures for alterations and fixtures are often necessary. More help is also required than in the United States. One American firm has 75 employees, among whom are 5 city salesmen and 2 traveling salesmen.

There are about 30 representatives of foreign paper exporting houses in Buenos Aires, who devote all their time to the sale of paper. Among these are representatives of four large American concerns, four important English exporters (C. & F. Spicer Bros., Alex. Cowan & Sons, John Dickinson & Co., and Mansell, Hunt, Caddy & Co.), and a large number of Norwegian, Swedish, Danish, and French concerns. In a few cases individual manufacturers are represented by local commission houses.

QUOTATIONS, TERMS, FREIGHT RATES, AND PACKING.

All quotations on paper offered for sale in Argentina should give the measures and weights in the metric system, as the use of inches to designate sizes, and pounds to designate weights, is almost a complete bar to sales. European manufacturers and dealers invariably give weights in grams per square meter, and this method is much simpler for the consumer to understand than the American system of basic weights. If the weight per square meter is given it is comparatively easy for the consumer to multiply the width of the sheet by the length to find the number of square centimeters, divide by 10,000 in order to reduce to square meters, and then multiply by the weight per square meter to find the weight of a sheet or any number of sheets. For instance, if the sheet measures 50 by 100 centimeters and weighs 50 grams to the square meter and it is desired to ascertain the weight of 1,000 sheets the problem resolves itself into the simple formula of $50\times100\div10{,}000\times50\times1{,}000=25{,}000$ grams or 25 kilos.

The usual terms that are granted the large printing establishments by the wholesalers of Buenos Aires are five months from date of sale. If cash payment is made, the bill is subject to a discount of 5 per cent; if it is paid in 30 days a discount of 4 per cent is allowed; in 60 days, 3 per cent; in 90 days, 2 per cent; and in 120 days, 1 per cent. Efforts have been made in the past few years to reduce these terms, but they have not met with much success. In normal times the wholesalers buy from the mills abroad at terms that are practically fixed by themselves. The usual terms, however, are 120 days from date of acceptance of draft, which is taken up on arrival of goods. American manufacturers have been unwilling to meet the terms of their European competitors and generally insist upon payment in 30 or 60 days. News print is sold on closer terms, and as a rule the Buenos Aires publishers pay their paper bills every 30 days.

Freight rates have an important effect upon paper imports. In the summer of 1917 the rate on news print from New York to Buenos Aires was almost equal to the value of the paper. In normal times rates are lower from European ports than they are from New York. The difference depends upon the season and the amount of freight offered. A large importer states that just before the war rates from Hamburg were 30 per cent lower than from New York. The quoting of c. i. f. prices by American manufacturers is absolutely necessary, as importers are unwilling to make purchases unless they know what the goods will cost in their warehouses. Experience has convinced them that it is far better to buy goods of European manufacture at a c. i. f. price than to purchase similar goods at a much lower price f. o. b. New York.

The question of packing is not so important in Argentina as it is on the west coast of South America where goods have to be reshipped several times before reaching their destination and have to be unloaded into lighters in open roadsteads. Cases used for domestic shipment, reinforced with iron straps, are sufficiently strong for ordinary shipments, as practically all freight for Buenos Aires is loaded directly into the ship hold in New York and not touched until it is unloaded at the docks at the destination. For news print in sheets, wrapping paper, and cardboard, the use of the bale is preferable, as there is a saving in freight charges. An outside wrapping of heavy packing paper should be used before the bale is strapped. There is a demand on the part of some of the Argentine publishers for the casing of news print in rolls, and all the paper from Europe comes packed in this way. The writer is convinced that there is no necessity for casing roll news print from the United States. While there is some loss where domestic packing is used, it is not believed that the loss will reach 2 per cent, which is less than the cost of export packing. Practically all of the damage is caused by the use of hooks, and if American shippers would insist that the steamship companies prohibit the use of hooks the loss would be reduced to a minimum. Tin-lined cases should be used for the packing of gummed papers, as the voyage through the Tropics is likely to cause a considerable loss in paper packed in ordinary cases.

TARIFF ON PAPER AND PAPER PRODUCTS.

Argentina has a high protective tariff on paper and paper products, and on some grades that are manufactured in the country the duties are so excessive as practically to prohibit their importation. The tariff, in general, is supposed to be ad valorem, but, as values are arbitrarily fixed, the duties are really specific. In the paper schedule there are specific duties on white writing and printing paper and on wrapping paper, and all other grades are subject to an ad valorem tax of 25 per cent upon the official valuation. In addition to the ad valorem tax there are two surtaxes—one of 2 per cent and the other of 5 per cent—now in force. These must be added to the ad valorem tax. There are also charges for storage and customs handling, crane charges, and a statistical tax.

News print for newspapers is now admitted free. It formerly was assessed at the specific rate of 2 cents Argentine gold per kilo, but this was reduced in February, 1915, to 1 cent, and in February, 1917, the duty was entirely removed. News print weighing less than 45 grams and more than 55 grams per square meter is assessed as printing paper and must pay the specific duty of 3 cents Argentine gold per kilo.

In the tables below are shown two complete clearances of paper, with the duties and charges collected by the customhouse at Buenos Aires. The net and exact invoice value is also used in arriving at effective percentages paid in duties. A study of these cases shows the inconsistencies of the Argentine tariff on paper and the obvious protective character of the duties.

The first covers white bond writing paper in reams of any size, quality, or weight. The duties would be the same for the cheapest sulphite bond as for the most expensive linen ledger paper. The weight is 2,500 kilos gross and 2,200 kilos, or 4,850 pounds, net. The invoice value is $319 United States currency net. It is dutiable under paragraph 2597 as amended by executive decree of February 17, 1915, at 3 cents gold specific per kilo net weight. The official valuation is 15 cents gold per kilo for the purpose of arriving at other charges. Duties are levied on net weight because of the form in which paper is packed:

	Pesos.
2,200 kilos at 3 cents Argentine gold specific	66.00
Storage (2,500 kilos gross weight), 5 cents per month for each 100 kilos or fraction	1.25
Slingage (equivalent to double the storage charges)	2.50
Crane charges, 35 cents per ton or fraction	1.05
Statistical tax of 20 cents for each $100 or fraction of official valuation	.80
Total gold pesos	71.60

This is equivalent to $69.09 United States currency, or 21.6 per cent of the net invoice value.

The second example illustrates a shipment of colored bond writing paper larger than double-foolscap size, in reams, and the invoice cost is exactly the same as that of the white bond of the previous shipment. It weighs 500 kilos gross and 440 kilos, or 970 pounds, net. The invoice value is $63.80 United States currency net. It is dutiable under paragraph 2609, a blanket paragraph covering all paper not otherwise specified. The official valuation is 40 cents Argentine gold per kilo net weight, and the duty is 25 per cent of this valuation, plus the surtaxes:

	Pesos.
25 per cent of 440 kilos at 40 cents Argentine gold per kilo	44.00
Surtax of 5 and 2 per cent upon official valuation of $176	12.32
Storage (on valuation)	.50
Slingage	1.00
Crane charges	.35
Statistical tax	.40
Total gold pesos	58.57

This equals $56.52 United States currency, or 88.6 per cent of the net invoice value.

There is, of course, no reason why one of these papers should pay 21.6 per cent and the other 88.6 per cent. This is undoubtedly a defect in the Argentine tariff law. No provision is made for colored writing or book paper larger than double foolscap.

The third example is an imaginary shipment of cheap wrapping paper, packed in bales and valued in normal times at $0.03 United States currency per pound. The gross weight is 1,000 kilos, or 2,205 pounds. No allowance is made for tare. The charges would be as follows:

	Pesos.
1,000 kilos at 8 cents Argentine gold specific per kilo	80.00
Storage	.50
Slingage	1.00
Crane charges	.35
Statistical tax	.20
Total gold pesos	82.05

This equals $78.28 United States currency, or 118 per cent of the net value.

In the following table are shown the values of paper and paper products as fixed by the Argentine tariff of values and the percentages of the ad valorem tax used for assessing duties. The values are also used in computing imports. It should be borne in mind, however, that the tariff is quite elastic and that many decisions and regulations governing the assessing of duties are not included in the printed tariff. An expert customhouse broker is therefore required to make clearances, and often he must obtain decisions from the authorities before merchandise is dispatched. The ad valorem duties are to be increased in each case by surtaxes of 7 per cent of the official valuation, the rates of duty shown being only the regular rates prescribed in the customs tariff.

Articles.	Valuation per pound.	Rate of duty (per cent of valuation).
	Pesos.	
White and colored wrapping paper of all kinds; thin, colored cover paper; paper for posters, kites, and sacks	0.035	(a)
Ordinary white paper for newspapers, in rolls or reams	.026	Free.
Cloth-covered paper for inside shoe soles	.109	25
White printing and writing paper of every class and size, inclusive of colored paper up to "oficio" size (12¾ by 17 inches)	.066	(b)
Building paper	.066	25
Ordinary wall paper	.109	25
Wall paper, gilded, silvered, or bronzed, common	.306	25

[a] Specific duty of 0.035 per pound.

[b] Specific duty of 0.013 per pound.

Articles.	Valuation per pound.	Rate of duty (per cent of valuation).
	Pesos.	
Wall paper, stamped or in imitation of leather, varnished or not varnished	0.262	25
Wall paper, stamped or in imitation of leather, when gilded, silvered, or bronzed	.657	25
Wall paper, tapestry, without gilding	.438	25
Wall paper, tapestry, gilded, bronzed, or silvered	.788	25
Photographic paper, including weight of container	.875	25
Cigarette paper	.262	25
Writing paper or cards in boxes, with corresponding envelopes	.175	25
Oiled paper for copy books, blotting paper, and toilet paper	.131	25
Tissue paper, decorated paper, paper for embroidery, and paper not otherwise specified	.175	25
Metal-covered paper, white or colored	.657	25
Blue-print and other paper for copies of plans	.262	25
Paper in rolls or disks for telegraphic instruments or indicators	.066	25
Transparent paper for windows	.700	25
Lace paper for flowers, boxes, cakes, or other adornments	.438	25
Pencil carbon paper	.657	25
Typewriter carbon paper	1.532	25
Cardboard, not covered, yellow strawboard, and gray cardboard, and pulpboard, common	.026	25
Cardboard, yellow strawboard, and gray cardboard, and pulpboard, covered, and of every other class of material, to fine quality	.053	25
Cardboard cut for boxes or printing purposes	.066	25
Cardboard printed for games, loose	.131	40
Cardboard for playing cards	.088	25
Bristol board of all kinds	.088	25
Cardboard boxes, empty, for matches	.306	40
Cardboard boxes, ordinary	.262	25
Cardboard boxes, or cases, ordinary, for hats, eyeglasses, razors, etc	.262	25
Cardboard or strawboard boxes, fancy, for confectionery or similar articles	.657	25
Cardboard or strawboard boxes, fancy, for sweets or similar objects, adorned with silk	1.751	25
Chromos, oleographs, or printed pictures, in colors, upon bristol board, cardboard, or paper, up to medium quality	.875	40
Same as above, fine quality	2.189	40
Labels for liquors, cigars, matches, perfumery, and similar articles, in one color	.438	40
Same as above in two or more colors, except photo-engravings	.569	40
Price labels, gummed or not gummed	.306	40
Same as above with inscription that gives them a special designation	.438	40
Price cards of cardboard, to be suspended	.109	40
Same as above, with inscription	.219	40
Paper lanterns	.153	25
Photographs on cards of any size, with or without inscriptions	1.313	25
Same as above, in colors	2.626	25
Photo-engravings	1.094	25
Printed matter, such as letters of exchange, checks, policies, shares, stamps, letters of credit, etc	.875	40
Printed matter, such as billheads, memoranda, paper and envelopes, receipts, etc., in one color	.262	40
Same as above, lithographed or engraved in copper or steel, and in colors	.438	40
Printing upon cardboard, in black, colors, or chromos, for advertisements or other uses, including tickets of all kinds, calendars and cards for calendars, with or without calendar pads	.262	40
Printing as above, but on bristol board, on cards, or other forms, for advertisements, with or without inscriptions, with the exception of photographs	.438	40
Printing upon paper for advertisements, and ordinary impressions upon cardboard for advertisements not mentioned in the preceding paragraphs; also loose blocks for calendars	.109	40
Blank books and composition books, paper bound, or bound in cardboard, including small books bound in rubber or cardboard	.131	25
Blank books, half bound, full bound, or cloth bound	.306	25
Printed books, in general, including maps	.175	Free.
Almanacs and advertising books	.109	40
Post cards without any other inscription than that denoting their character	.438	40
Sensitized post cards for photographs	.875	25
Same as above, with application of silk or mixed silk	1.094	40
Blank envelopes	.131	40
Envelopes, printed	.219	40
Blank cards, in general	.219	25
Greeting cards of every kind, including celluloid	.657	25
Cards with application of celluloid, silk, or felt	.875	25
Card mounts, printed or embossed for photographers	.438	2
Paper sacks, plain or printed	.153	25
Playing cards	(a)	(a)
Sandpaper	.053	40
Roofing paper	.022	25

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[a] Valued at $9.65 per gross; specific duty of $9.65 per gross.

CONDITION OF THE PRINTING INDUSTRY.

Like all industries in Argentina, the printing business has been seriously affected by the commercial depression that has existed during the past two or three years. For several years prior to 1912 the industry was prosperous. The wave of speculation that swept over the country during the years 1910 and 1911 had an important effect upon the consumption of printed matter. Many new companies were formed during this period and required stationery, blank books, stock certificates, bonds, and literature of all kinds. Real-estate operators found printer's ink a valuable ally in their campaigns and kept the presses busy turning out maps and booklets describing their projects. The celebration of the Centennial in 1910 was the occasion for the issuance of tons of advertising matter. Practically every large business house in the country distributed thousands of illustrated booklets, in which the history and extent of the business were described. During this golden period many new printing concerns sprang into existence and the older firms added to their equipment in order to care for the flood of orders. Early in 1912, when the signs of coming financial storms began to be evident, the printers were the first to feel the slowing down of business. For a while they were kept busy in producing the judicial printing necessary for the winding up of many concerns, which several years previous had been their most profitable customers.

With the beginning of the war new burdens were added. The German houses of Buenos Aires, which practically controlled the wholesale paper and printers' supply business, and which had been lax in their credits, demanded an immediate liquidation of accounts. The effect of the stringency in the world's paper markets began to be felt, and difficulty was experienced in obtaining paper to complete existing contracts. During the last six months of 1914 and practically all of 1915 the industry was completely demoralized, and it was not until the summer of 1916 that anything like normal conditions again prevailed. A tour of the principal plants in Buenos Aires was made by the writer in the summer of 1917, and it was seen that not more than one-third of the presses were in operation at that time. There can be no doubt, however, that more prosperous times are in store for those engaged in the graphic arts. Those who have long associated themselves with anything that has to do with Argentina and who have carefully studied its ups and downs are inevitably optimistic regarding its commercial future. Periods of depression rapidly take form at intervals of five to seven years. They are of short duration, and the eventual effect is nearly always good. They are dispersed with even greater rapidity than they form, and a period of great activity is sure to follow. The war has, and will continue to have for a number of years, far-reaching effects. It has temporarily put an end to immigration and the investment of foreign capital, but, on the other hand, it has stimulated the development of the agricultural and packing industries and created a demand on the part of the people for the production of everything needed for their own consumption. An encouraging sign, so far as the printers are concerned, is the establishment of a large number of small manufactories, especially those that require printed matter in the exploitation of their business. The war has demonstrated the fact that many articles such as medicines, soaps, perfumes, etc., can be profitably manufactured in the country, and each of these articles requires printed wrappers, boxes, labels, and advertising matter.

The following statistics compiled from the industrial census of 1914 give the number of printing and allied establishments in Buenos Aires in 1914, with data regarding their operations during that year:

Kind of establishment.	Number.	Capital.	Value of product.	Number of employees.	Wages.	Material consumed.	
						Native.	Imported.
Printers	328	$9,913,091	$8,415,988	5,513	$2,714,081	$1,410,073	$1,332,113
Lithographers	27	2,230,901	2,679,692	1,731	982,938	317,311	554,007
Manufacturers of articles of cardboard	37	708,852	1,444,346	1,078	343,835	77,909	344,964
Manufacturers of articles of paper	7	141,628	299,880	88	54,736	69,212	7,480
Binders	33	226,652	408,443	445	163,053	41,829	91,338
Music printers	3	17,820	99,000	58	23,560	3,080	10,846
Manufacturers of blank books	4	31,460	102,520	71	32,705	18,480	11,440
Manufacturers of playing cards	2	103,400	84,480	23	9,680	....	13,728
Manufacturers of carbon paper	2	39,600	79,200	41	13,375	14,960	2,200
Photo-engravers	12	96,247	141,482	80	44,021	12,014	13,332
Total	455	13,509,651	13,755,031	9,128	4,381,984	1,964,868	2,381,448

Late statistics are not available for the rest of the country. It is estimated that the entire number of printing and lithographing plants in Argentina outside of Buenos Aires equals those in that city, but their capital, number of employees, output, and material consumed are not nearly so large.

DESCRIPTION OF PRINCIPAL ESTABLISHMENTS.

The largest printing and lithographing establishment in Argentina, and one of the most important in South America, is that of the Compañía General de Fósforos, which also manufactures paper and matches. Shortly after the company was organized in 1889 a small printing plant was installed for the production of match boxes and advertising matter, and 10 years later the operations were extended to include work for outside firms. The modern concrete building at California 2600, Buenos Aires, has a floor space of 15,000 square meters (161,460 square feet). There are some 300 machines, which produced 120,000,000 printed sheets in 1916. The works are divided into four principal divisions—(1) printing and lithographing department, with the section of photogravure and three-color printing; (2) blank-book department; (3) calendar department; and (4) playing-card department. Match boxes are now manufactured in the paper mill at Bernal. In the printing and lithographing department the machinery is principally American. There are 12 R. Hoe & Co. stone lithographing presses, 5 Miehle two-revolution presses, a Walter Scott lithographing press, 2 Huber two-revolution presses, an Aluminum Co. rotary press for printing from zinc, and 7 Dexter automatic feeders. There are also 2 G. Mann (English) offset presses, an L. & M. (English) two-revolution press, 12 German and French letter-press cylinders, and 14 platen presses. Among the latter are several American presses. In the calendar department a Kidder automatic is used for printing calendar pads. Seybold cutters have been adopted as the standard for cutting machinery and are replacing the German cutters. Seven of these machines have been installed and two more have been ordered. In the bookbinding and ruling sections the machinery is all German. In the former, Brehmer (German) folders and sewing and stitching machines are used exclusively, while in the latter six Förste & Tromm disk ruling machines are used. There are 900 operatives at present, one-half of whom are girls. In 1916 the paper consumption was as follows: Domestic manufacture, paper 1,500 tons, cardboard 410 tons; imported, paper 406 tons, cardboard 158 tons; a total of 2,474 tons.

The second largest plant in the country prior to June 6, 1917, when a fire destroyed the larger part of the building, entailing a loss of $250,000, was that of Guillermo Kraft, which was established 50 years ago. The equipment consisted of 65 or more letter-press and stone lithographing machines, 2 Mann (English) offset presses, 14 Mergenthalers, and photo-engraving and bindery machinery. At the time of the writing of this report (July 20, 1917) operations had been resumed on a small scale and the work of rebuilding the burned structure was under way.

The Compañía Sud Americana de Billetes de Banco, which formerly ranked as the foremost engraving, printing, and lithographing establishment in South America, has lost a considerable portion of its business in recent years, largely because of the establishment by the Argentine Government of its own plant for the production of bonds, bank notes, postage stamps, and lottery tickets. Its business now consists largely of the manufacture of blank books and the printing of the important weekly magazine P. T. B., which is owned by the company. The business was established in 1885, and the stock is held principally by Germans. Included in its machinery are 4 Augsburg (German) double-feed magazine presses, each equipped with 2 automatic feeders, for printing P. T. B., a Mann (English) two-color offset press, 15 German letter-press cylinders, 9 German stone lithographing presses, and 10 platen presses. In the bindery are 7 Krause (German) cutting machines, 6 Brehmer (German) folding machines, 10 Brehmer (German) stitching machines, and a number of smaller machines. Six Mergenthalers are used in the composing room, and an order has been placed for a battery of monotypes. At present 450 employees are engaged.

The Casa Jacobo Peuser is an important firm of stationers and printers. Their main store, in the heart of the business section of Buenos Aires, is one of the largest stationery stores in South America. A branch is maintained in another section of the city, and there are also branches in La Plata, Rosario, and Bahia Blanca. In the printing works 400 men are employed. The firm makes a specialty of high-grade printing, lithographs, postal cards, photogravures, calendars, and blank books. The principal machinery consists of 2 Mann (English) offset presses, 19 letter-press and stone lithographing presses, 4 automatic ticket-printing presses, 2 English automatic die-stamping presses, 12 Hickok ruling machines, 8 cutting machines, 14 platen presses, 3 folding machines, 3 book-sewing machines, 3 stitching machines, and 2 Typographs. With the exception of 12 Chandler & Price job presses, 2 Mann (English) offset presses, 2 Marinoni (French) cylinders, and 2 English automatic die presses, the machinery is all of German manufacture. In the extensive warehouses are carried 3,000 cases of book and lithographic paper. In normal times practically all of the paper consumed is bought in Germany, but in the last three years considerable quantities of paper and stationery have been purchased in the United States. In celebration of the fiftieth anniversary of the establishment of the firm a handsome book, containing views of the stores and printing plant and specimens of work, was issued and forms one of the exhibits in connection with this report (Exhibit No. 18).

The most important magazine and catalogue printing firm is the Sucesión de Ricardo Radaelli, which was established in 1897. Among the important publications printed by this firm are the weeklies Mundo Argentino, with a circulation of 115,000, El Hogar, with a circulation of 55,000, and Fray Mocho, with a circulation of 50,000, as well as department-store catalogues and telephone directories. The principal machinery consists of 2 Mann (English) offset presses, 3 rotary magazine presses, 14 cylinder presses for letter-press printing, 9 stone lithographing presses, 9 automatic feeders, and 8 Mergenthalers. With the exception of one Miehle two-revolution press, all the cylinders are German or English. The bindery equipment is entirely German.

GOVERNMENT PRINTING OFFICES.

There are seven printing offices in Buenos Aires maintained by different branches of the Federal Government. In 1917 a law was adopted providing for the consolidation of all these establishments, with the exception of the Penitentiary Printing Office, into one Government printing office under the supervision of the director of the Mint. Owing to the financial condition of the Government no appropriation was made to carry the plan into effect, and several years will probably elapse before the consolidation takes place. The present buildings occupied by the Mint would be inadequate to house the combined plants, and it will be necessary to purchase additional ground and erect or remodel buildings.

The Mint, or Casa de Moneda, is the most important of the Government's printing establishments. It occupies a modern building in the center of Buenos Aires and is equipped with up-to-date machinery. The Mint is one of the oldest of the Government's establishments, but the printing departments are of recent origin. The first printing press was installed in 1887 with the object of stamping the official paper required for all legal documents. In 1898 the printing of bank notes was begun, and in 1901 the Government began to print the postage stamps. In addition to printing for the Government some outside work for financial institutions is undertaken. In 1917 the Mint secured the contract for printing the bank notes of Uruguay.

The printing of bank notes is one of the most important branches of the Mint's work. Argentine bank notes are quite simple in design. Italian handmade paper containing the value of each bill watermarked in the center constitutes the sole protection against counterfeiting. The bills are printed from electrotypes, and the safeguards surrounding the duplication of these plates are meager. The bills are printed on 7 Lambert (French) two-color presses. Internal-revenue stamps are printed on 10 letterpress cylinders, 3 of which are English presses similar to a popular American model and equipped with automatic feeders. Lottery tickets, bonds, drafts, and other Government values are produced on 2 Mann (English) offset presses and 2 Johannisberg (German) stone lithographing presses. Official stamped paper is embossed and printed at one operation on 2 Revasse (French) machines. Postage stamps are gummed on 2 Lambert (French) machines. For smaller work 12 platen presses, 5 of which were manufactured in the United States, are used. The bindery is equipped with German ruling, book-sewing, stitching, and cutting machines.

The Mint employs 240 operatives in its printing and binding departments, about one-fourth of whom are girls. The paper consumed in 1916 was valued at $65,120.

The printing office of the Department of Agriculture is the second in size of the Government establishments. It was opened in 1901 and has 115 employees. The value of the paper consumed in 1916 was $66,000. The plant is equipped with eight cylinder presses, four stone lithographing presses, three cutting machines, two folding machines, three stitching machines, and three composing machines. With the exception of one French cylinder press and one American book-sewing machine all of the machinery is German.

The printing office of the Federal Penitentiary was established in 1902 with the object of giving employment to the prisoners and producing work for the various departments of the Government. From 100 to 150 prisoners are constantly employed in the printing, lithographing, binding, and photo-engraving sections and receive from 60 centavos to 2 pesos ($0.26 to $0.88) per day. Ninety per cent of their wages are paid to their families or retained until they are liberated. In 1915 the shops produced work valued at $144,383. The paper consumed was valued at about $50,000. The most important work produced at the penitentiary consists of the printing of the two Government daily newspapers—the Boletín Oficial and the Boletín Judicial. The equipment consists of a Duplex flat-bed perfecting press, made in Zurich, Switzerland, 9 French and German letterpress cylinders, 3 German stone lithographing presses, 3 German ruling machines, 4 German cutting machines, and 10 German composing machines.

Among the smaller Government offices in Buenos Aires are those of the Department of Public Works, the Department of War, the Department of the Navy, and the Police Department.

A number of the Provinces have official printing offices that supply the provincial departments with their stationery and printed matter. The largest of these is that of the Province of Buenos Aires, located at La Plata. The plant is equipped with an English offset press, nine cylinder presses, four stone lithographing presses, two German and five American composing machines, and a complete bindery and photo-engraving department. It employs 130 operatives.

NEWSPAPERS AND OTHER STATED PUBLICATIONS.

The newspapers and other stated publications of Argentina have largely decreased in number since the beginning of the war. The high price and scarcity of paper and the decline in advertising have made it impossible for many of the smaller publications, which had been barely meeting expenses, to exist when there was an increased cost of production and a falling off in receipts. It was estimated that in 1913 there were more than 800 regular publications in the Republic. At the end of 1915 this number had decreased to 513, and at the present time it is even smaller. The greater part of those that have suspended publication are weekly and monthly class journals and dailies and weeklies in the smaller cities. The larger papers have met the situation by curtailing circulation, cutting down the number of pages, and practicing other economies. In the interior a number of newspapers that were formerly published daily are now published every other day.

The following table shows the number of publications, and data regarding their operations, for the year 1915:

Provinces and Territories.	Number of publications.	Number of employees.	Capital.	Annual expenses.
Federal District	153	4,230	$13,226,042	$7,259,097
Buenos Aires	241	1,667	1,011,138	708,691
Santa Fe	26	391	809,283	572,007
Entre Rios	21	202	116,242	87,310
Corrientes	5	47	5,042	4,734
Cordoba	16	247	144,100	185,460
Santiago del Estero	3	25	23,540	16,896
San Luis	7	70	41,800	25,674
Tucuman	4	80	148,720	147,312
Mendoza	8	125	251,431	145,831
San Juan	4	48	50,160	12,998
La Rioja	1	10	26,400	1,760
Catamarca	2	35	20,460	5,280
Salta	3	37	31,680	19,536
Jujuy	3	31	7,920	9,975
Chaco	3	10	3,485	3,045
Formosa	1	9	1,760	1,065
Misiones	4	31	18,920	16,280
La Pampa	8	66	29,480	23,734
Rio Negro	2	25	1,320	2,420
Chubut	3	15	8,382	3,872
Total	518	7,401	15,977,305	9,252,977

Among the publications of Buenos Aires are included 33 daily newspapers, of which 19 are newspapers of general circulation in Spanish, 2 are business dailies, 2 official publications of the Argentine Government, and 10 dailies published in foreign languages. Of the latter 4 are in Italian, 2 in English, 2 in German, 1 in Syrian, and 1 in French. In the main they are modern newspapers in every respect, and 2 of them rank among the great newspapers of the world. Much attention is given to foreign news, and the larger papers devote two or more pages to cable dispatches. Great care is taken in the editing of this news, and one of the papers posts on a bulletin board the originals of all the cables that are received. Up to three years ago little space was given to news from the United States, but recently there has been an improvement in both the quantity and the quality of American news. One of the large dailies has an arrangement with a New York newspaper by which it receives the latter's European and North American news in exchange for its South American news. Another receives the full news service of an American press association.

Buenos Aires newspapers use all the news that it is possible to insert in their columns. Illustrations are sparingly used and there is a noticeable lack of "scare heads" such as are used by the sensational press of the United States. On the other hand, the news is well classified. Cables, telegrams from the interior, political news, and local happenings are separately grouped and each class appears on a particular page each day, so that the reader can readily find the news in which he is interested. Often, however, the lack of suitable headings causes important news items to be buried. While all the large newspapers have modern perfecting presses with color decks, and one has a 40-page press equipped to print in four colors, colors are rarely used. One paper prints a colored supplement once a week, and another prints advertisements in red ink on its front page.

The large dailies are rather serious in their vein. Little or no space is given to the publication of "features," such as fashions, society gossip, household hints, or comic strips. In fact, it would seem that they are published exclusively for men. The editorials are heavy and deal principally with political or international subjects. A column is generally devoted to personal news under the heading "Vida Social" ("Social Life"), but the principal items relate to deaths and funerals. All the dailies, including the afternoon papers, publish Sunday editions, but there is nothing to distinguish them from those of the other days in the week.

Circulations are large, considering the high price at which the papers are sold. Two of the Buenos Aires dailies have circulations in excess of 150,000, and others range from 25,000 to 75,000 copies. Little effort is made to increase circulations, and the use of contests, premiums, and similar methods is unknown. Practically all the dailies sell for 10 centavos ($0.044) each.

Advertising rates are somewhat higher per 1,000 circulation than those that prevail in the United States. All rates are quoted in Argentine silver currency per centimeter (0.39 inch) in length by the width of the column. The columns are generally 2¼ inches wide. Rates range from 1 peso per centimeter ($1.10 per inch) for the smaller papers to 5 pesos per centimeter ($5.50 per inch) for the larger. Low rates are quoted for classified advertising, which in the larger papers occupies the first two or three pages. One paper publishes 80,000 of these small advertisements per month at an average rate of $0.30 each.

In Buenos Aires are published a number of high-grade weekly and monthly magazines. Five of the weeklies have circulations of from 40,000 to 115,000. They are well printed and illustrated and their pages are devoted to local happenings, society and fashion news, and caricatures. Little or no space is given to fiction. Three other weeklies are highly sensational and are bought principally by the servant class. There are two monthly magazines that are noteworthy specimens of the printer's and engraver's art. They are printed on the finest coated paper, and their illustrations in color are worthy of preservation.

Other stated publications of Buenos Aires include weeklies in English, German, Italian, Russian, Hebrew, and French; commercial and financial reviews; technical and class journals; and a large number of weekly and monthly bulletins issued by philanthropic, scientific, and political organizations.

In each of the principal cities of the Republic are published one or more newspapers that closely resemble the big dailies of the capital, with the exception that less cable news is printed and their circulations are smaller. Some of these papers, however, have circulations in excess of 30,000 copies. In the smaller towns the newspapers are local publications and receive little or no telegraphic news. They generally consist of four pages and, except in rare instances, their circulation does not exceed 1,000 copies.

DETAILS OF PRINCIPAL PUBLICATIONS.

At the head of Argentine journalism stands the great morning daily, La Prensa, which is regarded as one of the world's greatest newspapers in point of equipment, telegraphic service, and activities that enter into the make-up of a modern daily. It was founded October 18, 1869, and its first number consisted of two pages of five columns each. From this modest start it has increased year by year until its regular edition now consists of from 20 to 24 pages and often rises to 48 pages. Its average circulation at present is 165,000, but before the war its average was 200,000 and the circulation reached 240,000 on several days in each week. Few newspapers in the world have as extensive telegraphic service. In addition to its own correspondents in London, Berlin, Paris, Hamburg, Madrid, New York, and all the principal cities of South America, it has an exchange arrangement with the New York Herald by which it receives all the telegraphic service of that paper. Its annual expense for cables and correspondents is $300,000.

La Prensa's home on the Avenida de Mayo is one of the show places of Buenos Aires. The edifice consists of two underground floors and six floors above the street level. Capping the tower at an elevation of 170 feet is a bronze figure, symbolic of the liberty of the press, which is a landmark for the mariner entering the port. In the basement are installed four R. Hoe & Co. perfecting presses. Three of these are 24-page presses, and the fourth is a 40-page press capable of producing 60,000 papers per hour. All these presses are equipped with color decks.

On the main floors are located the general offices, editorial rooms, libraries, restaurant, gymnasium, and philanthropic and educational departments for which La Prensa is noted. These latter include a free legal bureau, where the leading jurists of Buenos Aires can be found at certain hours of the day; the free medical and surgical department, which is in charge of several of the best-known specialists in the country; a school of music, where free instruction is given to several hundred children; three libraries, which are open to the public at all hours of the day; several reception rooms and assembly halls where organizations may hold their meetings without charge; a People's Institute, where popular conferences are held every week; a meteorological observatory, which keeps the readers of La Prensa in touch with meteorological and climatic conditions; and a chemical, industrial, and agricultural bureau, which renders free service to commercial, manufacturing, and farming interests. On the fourth floor of the building are magnificent quarters consisting of parlors, dining room, sleeping rooms, baths, etc., where distinguished visitors, literary celebrities, eminent travelers, and others are entertained by La Prensa during their stay in the city. In the composing room, on the top floor, are installed 19 Mergenthalers. The heating and power plant is located in a separate building.

La Nación is a close second to La Prensa in influence and circulation. It has made rapid progress in recent years and holds a strong place in the affections of the Argentine people. It was established in 1870 and succeeded La Nación Argentina. Its regular edition consists of from 16 to 24 pages. Its circulation at present is 130,000, but before the war it was 150,000. In addition to its large number of correspondents in the principal cities of Europe and South America, La Nación receives the full telegraphic service of the United Press Association and devotes several columns daily to news of North America. Its home on Calle San Martin, while not as pretentious as that of its powerful competitor, contains a modern printing plant. Its presses consist of two Marinoni (French) 24-page perfecting presses and an Augsburg (German) 24-page perfecting press. In the summer of 1917 a new Goss press was being installed, and it is the intention of the management to replace all of its European presses with those of American manufacture. Its composing room is equipped with 19 Mergenthalers. La Nación also publishes a library of fiction and scientific and historical works. Thus far more than 700 different volumes have been published.

After La Prensa and La Nación come several dailies of more or less equal importance. These are La Razón, an afternoon paper, with a circulation of about 70,000; La Época, a rapidly growing afternoon daily, which represents the party now in control of the Government; La Argentina, a popular morning paper that formerly sold for 5 centavos but recently increased its price to 10 centavos; La Vanguardia, the socialist organ, with a circulation of 40,000 copies; and El Diario, an afternoon paper, with a circulation of 30,000. Among the smaller dailies are La Manaña, a popular morning paper; La Unión, an afternoon paper that represents the German interests; Ultima Hora, an afternoon daily principally devoting to sporting and theatrical news; Crítica, an illustrated evening paper; El Avisador Mercantil and El Cronista Comercial, devoted to commercial and financial news; Gaceta del Foro, a legal daily; Boletín Oficial and Boletín Judicial, official publications of the Government; and La Gaceta de Buenos Aires, El Nacional, Idea Nacional, and El Imparcial, small newspapers with limited circulations.

Among the dailies published in foreign languages La Patria degli Italiani has the largest circulation, its average edition consisting of 40,000 copies. Giornale d'Italia, with a circulation of 25,000, is the second. There are two other Italian dailies, Il Roma and La Grande Italia. The two English papers are The Standard and The Buenos Aires Herald. The former, which has a circulation of 5,500 copies, was established in 1861, and the latter, with a circulation of 4,500, in 1876. Both papers print from 8 to 16 pages daily. The German colony is represented by two dailies in German—Deutsche La Plata Zeitung and Argentinisches Tageblatt. The first of these was established in 1868 and has a circulation in excess of 5,000 copies. The

latter was founded in 1888 and prints about 3,000 copies. Le Courrier de la Plata and El Diario Español are the daily papers of the French and Spanish colonies, respectively.

The illustrated weekly Caras y Caretas stands at the head of Argentine magazines, although in point of circulation it is exceeded by Mundo Argentino. The former has one of the best-equipped printing plants in South America. Its presses consist of three Vogtlandische Maschinenfabrik (German) rotary magazine presses, one of which is a five-color press; 10 Augsburg (German) cylinder presses, 6 of which are equipped with automatic feeders; and an L. & M. (English) two-revolution press. In the composing room are 2 Mergenthalers and 3 monotypes. Two German automatic machines are used for gathering, stitching, and pasting on the covers and 2 Krause (German) continuous cutters for trimming the magazines. The ordinary edition of Caras y Caretas consists of from 80 to 140 pages, more than half of which are devoted to illustrations of local events. Its circulation is 90,000.

Mundo Argentino has a circulation of 115,000 and a large number of its pages are devoted to illustrations. P. B. T. and Fray Mocho are weeklies similar to Caras y Caretas, but with much smaller circulations. Plus Ultra and Myriam are very handsome monthly magazines printed in three colors.

In the other cities of Argentina there are several newspapers that deserve mention. Among these are La Capital, of Rosario; El Orden, of Tucuman; Los Principios, of Cordova; Los Andes, of Mendoza; La Nueva Provincia and El Censor, of Bahia Blanca; and El Día, of La Plata. Each of these is printed on modern perfecting presses and their composing rooms are equipped with typesetting machines. Their daily editions consist of from 8 to 24 pages, and their circulations range from 20,000 to 40,000 copies. As a rule they have arrangements with the newspapers of Buenos Aires for their telegraphic service.

WAGES AND HOURS.

Printers' wages differ greatly in various parts of the country. In Buenos Aires, Rosario, and some of the larger cities operatives are given steady employment at wages that compare favorably with those of other trades, but in the interior there is no uniform scale and the earnings of a typesetter or pressman are very small. There is a union of printers in Buenos Aires known as the Sociedad Tipográfica Bonaerense, which has a working agreement with the Unión Industrial Argentina, an organization of manufacturers that numbers among its members all of the large employing printers. The agreement between these organizations (Exhibit No. 19) was adopted January 1, 1912, and is still in force. The rates of daily wages are as follows: Compositors, from 4.40 to 6 pesos ($1.87 to $2.55); machine operators, 5.20 to 7 pesos ($2.21 to $2.97); pressmen, 3.80 to 6.20 pesos ($1.60 to $2.63); feeders, 1.60 to 2 pesos ($0.67 to $0.85); bookbinders, 4 to 5.60 pesos ($1.70 to $2.38); rulers, 3.40 to 6 pesos ($1.45 to $2.55). Apprentices receive from 60 centavos to 1 peso ($0.26 to $0.43), and girls who work in paper and envelope factories from 1 to 2.50 pesos ($0.43 to $1.06).

There is an abundance of girl help to be obtained in Buenos Aires, but the printers prefer men and boys, although in one large establishment girls are employed in feeding job presses and folding machines.

The hours of labor are fixed by the agreement at 48 hours per week, but under certain circumstances these hours can be exceeded.

CONSUMPTION OF PAPER BY ARGENTINE GOVERNMENT.

The Government is perhaps the largest consumer of paper in the country, its annual purchases amounting to about $500,000 and comprising many different grades of paper, from Italian hand-made paper used for printing bank notes to American news print used for the two official daily newspapers. In this amount is included stationery, carbon paper, drawing paper, and toilet paper used by the various departments of the Federal Government. There is no central purchasing agency, and each department purchases its supplies without reference to any other.

The governments of the various Provinces are also large consumers of paper. Nearly all of these have printing offices where official publications are printed, and, in addition, they buy office supplies necessary for the transaction of public business.

All purchases by the central Government, as well as those of the Provinces, are made after public tenders have been received. Requests for bids are advertised in the official publications. On small orders 30 days is generally allowed between the time of the insertion of the advertisement and the opening of the bids, but on large orders, where foreign factories have to be consulted, this time is extended to as much as six months.

On proposals for the purchase of paper each prospective bidder is furnished with detailed specifications covering the articles desired. Exhibit No. 23 shows the specifications covering the paper to be used for postage stamps. The advertisement appeared May 28, 1917, and the bids were to be opened October 1, 1917. In the specifications are stated the quantity, weight, size, tensile strength, watermark, materials to be used in manufacture, and the manner in which the paper is to be packed. Each bid must be accompanied by 10 samples, which must be exactly the same as the paper to be supplied, including the prescribed or a similar watermark. A deposit of 3 per cent of the total amount of the bid must also be made. It is doubtful whether any American manufacturer can be found who would be willing to meet the requirements, expecially those in reference to the position of the watermark in each sheet.

The conditions surrounding the purchase of paper by the Government are such that only manufacturers who have well-qualified representatives on the ground have an opportunity to procure any part of the business.

ARGENTINE PAPER PRODUCTION.

In normal times about 40 per cent of the paper consumed in Argentina is manufactured in the country, but this condition is largely due to the high protective tariff on wrapping and colored paper, and the lower but still considerable duty on printing and writing paper, which enables the local factories to compete with the foreign product. For the past two or three years the industry, despite a smaller production, has been quite prosperous as a result of the demoralization of the paper markets in the United States and Europe and the high freight rates that have prevailed on all imported goods. The paper makers, on their part, have been faced with rising costs of raw materials, fuel, and chemicals, but the high prices that they have been able to obtain for their product have enabled them to earn very satisfactory dividends.

There are 10 factories in the country, of which 5 may be regarded as fairly large concerns manufacturing practically all grades of printing, writing, and wrapping paper, and 5 as smaller factories whose chief product is wrapping paper and cheap cardboard. One of the mills in the first group is not now in operation, in accordance with an agreement that exists between the large manufacturers.

The following table gives the estimated capacity and output of the local mills during 1916:

Name of mill.	Daily capacity.	Daily production, 1916.
	Metric tons.	*Metric tons.*
La Argentina, Zarate	60	45
Cia. de Fosforos, Bernal	34	28
El Fenix, Campaña	19	18
El Fenix, Vicente Lopez	20	....
Fábrica Casati, San Nicolas	12	10
Smaller mills	23	14
Total	168	115

During 1916 the mills were in operation 5 days in each week, or a total of 250 days during the year. Their total production, therefore, was about 28,750 metric tons. Of this amount it is estimated that 6,000 tons consisted of news print, 8,000 tons of printing and writing paper, and 5,000 tons of cardboard. At the prices that prevailed in 1916, the value of the product was slightly in excess of $7,000,000. The 10 mills have a capital of $4,180,000 and 1,800 employees.

The materials used in the manufacture of paper and cardboard consist of ground and sulphite wood pulp, rags, and waste paper. The first two of these (nearly all imported) are the most important. The average quantity imported is 23,000 tons per annum, nearly all of which comes from the Scandinavian countries. In 1913, when the production of the local mills reached the highest figure in their history, the imports reached 31,000 tons, but in 1915 dropped to 15,000 tons. The only mill making domestic pulp is El Fenix, which in 1916 began to manufacture this material from the poplar and willow trees that grow in abundance on the banks of the Parana River. The production is small, hardly reaching 8 tons per day. The mechanical process is used and the resulting pulp (sample No. 1) is used principally as a filler. The production of pulp from rags and waste paper by all of the mills is approximately 62 tons per day, or a total of some 17,500 tons during the year 1916.

PROPOSED MANUFACTURE OF PULP FROM DOMESTIC MATERIALS.

The high prices and scarcity of paper during the past two years have aroused considerable interest in Argentina in the further development of the paper industry and especially in the manufacture of pulp from domestic materials. The Department of Agriculture has received a large number of requests for data regarding the available supply of fiber-producing trees and plants. Considerable interest in the subject has been shown by La Papelera Española, one of the principal manufacturers of paper in Spain. The department has recently completed a study of the subject and a copy of the report of the engineers who made the investigation is included in the exhibits in connection with this report (Exhibits Nos. 1 and 2). Some 65 or more different materials suitable for the manufacture of paper were found in the country, but only a few of these exist in sufficient quantities to be of real importance. Among the latter are the *araucaria imbricata*, a species of pine, the *populus nigra* or "alamo" (poplar), the *sambucus peruviana* or "sauce" (willow), "bagazo" (refuse of sugar cane), and fibers to be obtained from the flax, castor, and cotton plants. Practically all of the experts agree that the first of these is the most suitable and is to be found in the largest quantities. Unfortunately the forests of these trees are located in parts of the country not yet reached by railways, and until the question of transportation is settled the wood will not be available. The most extensive forests of the *araucaria imbricata* are to be found in the territory of Neuquen on the extreme western border of the country, in the valleys formed by the Agrio and Alumine Rivers. The forests extend into Chile and are at an altitude of from 3,000 to 5,000 feet. The nearest railway is the Ferrocarril del Sur, which now reaches Zapala. From this point it is a distance of from 60 to 70 miles to the center of the forests. The extension of this railway into Chile so as to form a new transcontinental line is under consideration, but a number of years will probably elapse before this is done. It is estimated that the construction of a line of railway from the present terminus to the forests would entail an expense of not less than $1,500,000. An extensive study of this territory was made in 1915 by Engineer Max Rothkugel, and his report has recently been published by the Department of Agriculture under the title of "Los Bosques Patagonicos" (Exhibit No. 3). In this report the author says:

> Few forests exist in the world that rival in beauty and grandeur those of this region. The trees, with their great trunks covered with thick bark and their limbs and branches hidden by needles and cones, make one think that they were created in times far remote when trees were given an armor to protect them from the saurians and other prehistoric animals that rose from the Andean sea. Personally, I have had the opportunity to visit the Black Forest of Germany, the mighty oak forests of Slavonia and Austria, and the American forests from the Appalachian Range to Alaska, but I consider that the region of Neuquen possesses an aspect far grander than any of these.

According to the Government estimates there are in this region about 200,000 square acres of land covered with these trees, of which about one-half are national property. Each acre is said to contain 25 tons of wood, a total of some 5,000,000 tons, from which it is possible to realize 2,500,000 tons of pulp, a quantity sufficient for the needs of the country, at the present rate of consumption, for approximately 50 years.

In the mountains nearby are said to be waterfalls from which sufficient electrical power can be produced to grind the wood.

The Government experts estimate that $1,000,000 would be required to erect a mill capable of producing 7,500 tons per annum, and that pulp could be produced and delivered in Buenos Aires for $24 per ton.

DESCRIPTION OF PRINCIPAL MILLS.

The largest manufacturer of paper in Argentina is La Argentina (S. A.) para la Fabricación de Papel, whose mill is located at Zarate, 57 miles from Buenos Aires, on the Argentine Central Railway and the Parana River. The company was established in 1888 and has a capital of $2,200,000. According to the balance sheet of December 31, 1915, the value of the buildings and machinery was $1,328,903. In 1915, the net earnings were $234,654, and in 1916 they were said to be considerably larger. The machinery consists of nine Fourdrinier machines, eight of which were made in Germany and Belgium and one in the United States. With one exception, all the machines are small. The 1916 production was about 10,000 tons, of which about 4,000 tons consisted of news print in rolls. Among other grades manufactured are printing and writing paper, colored poster, wrapping paper, tissue paper, drawing paper, and cardboard. In the paper-sack department are 18 bag machines. The mill during 1916 gave employment to about 600 men and women.

The Compañía General de Fósforos has the second largest and probably the most modern mill in the country. It is located at Bernal, 6 miles from the center of Buenos Aires. The paper-manufacturing department of this large match-manufacturing concern was established in 1906 with the object of producing the cardboard and wrapping paper used in its own establishments, but in 1911 considerable additions were made to the original plant and the manufacture of other grades of paper was commenced. The company owns 250,000 square meters of land contiguous to the River Plate, upon which have been erected reinforced concrete buildings. The land, buildings, and machinery are valued at $1,000,000. An abundant supply of pure water is obtained from four artesian wells. Steam is produced from petroleum, coal, and wood. The first-named fuel is usually purchased from the Anglo-Mexican Petroleum Co. at $10.56 per ton, but no supply has been available for the past year. Coal, which in normal times costs $9 per ton, could only be procured in small quantities in the summer of 1917 at $33 per ton. The principal fuel at present is wood, which comes from the Chaco in northern Argentina and costs $10.50 per ton. The machinery consists of one 120-inch and one 108-inch Fourdrinier machine made by Moore & White of Philadelphia, 19 beaters of 1,500 pounds capacity each, 2 Jordan beating engines, 5 waste-paper grinding mills, 8 German calender machines, 3 German coating machines. 1 rag thrasher and 1 fan duster made by the Holyoke Machine Co., 1 Seybold cutting machine, 1 Collis (London) cutting machine, 1 Lawrence cutting machine, and a number of German cutting machines. One of the Fourdrinier machines is continuously employed on white printing and writing paper, and the other on gray cardboard and wrapping paper. In the paper-bag department are 3 Strachan & Henshaw (English) paper-bag machines. At the paper mill are also installed 2 Ed. Lambert & Co. (Paris) four-color printing presses, equipped with Dexter automatic feeders, for printing the boxes used in the match factory. From these machines the printed sheets go through a varnishing machine to the 17 die cutters, which were designed and manufactured in the company's machine shops. One million match boxes are produced every day. The company has 500 employees in the Bernal plant, of whom one-third are girls. The latter receive from $1 to $1.25 per day of eight hours. Ordinary laborers are paid $1.30 per day, machine tenders and cutters from $2 to $2.50 per day, and foremen $3.50 per day. The company has a pension plan for all employees who have been in its service for 20 years, and free medical attention is given by a physician who visits the mill daily. In 1916 and 1917 the mill was operated continuously from Monday morning to Friday night, three shifts of employees working every 24 hours. The daily production was 20 tons of white printing and writing paper and 20 tons of wrapping paper and cardboard.

The Fábrica de Papel El Fenix, S. A., has two mills, one located at Campaña, 50 miles from Buenos Aires on the Argentine Central Railway and the Parana River, and the other at Vicente Lopez, 8 miles from Buenos Aires on the same railway. The latter of these has not been in operation since 1914, in accordance with an agreement existing between the principal companies to limit production during the period of business depression through which the country has been passing. In this mill are installed one 94-inch, one 85-inch, and one 72-inch Fourdrinier machine, with a capacity of 20 tons per day. At the Campaña mill are two machines; one of these is a 116-inch machine made in Germany, and the other a 94-inch machine made in Austria. The mill produces news print, writing, printing, and wrapping paper, and has a capacity of 19 tons per day. In 1916 the production was about 4,000 tons. There are 300 employees in the various departments, a third of whom are girls. The company was established in 1913 and is a consolidation of the mills formerly owned by Pablo Denti & Co. The Campaña mill was erected in 1900 and the Vicente Lopez mill in 1903.

The Fábrica de Papel (Casati) de San Nicolás, S. A., is located at San Nicolás, 148 miles from Buenos Aires, on the Argentine Central Railway and the Parana River. It has two small machines and produces printing, writing, wrapping, and cover paper. Its production in 1916 was about 2,000 tons.

The five small mills are located in different parts of the country, three near Rosario, one in Buenos Aires, and one in Cordoba. They are small concerns whose product is wrapping paper and cardboard.

METHODS OF ENTERING ARGENTINE MARKET.

A careful study of the market will be required on the part of American manufacturers who are not already represented in the country but who desire to obtain new business from Argentina. Not only must they be satisfied that there is a sale for their products and that they can meet the competition from other countries, but the fact should be emphasized that a large capital is required. As has been previously pointed out in this report, Argentina is a big man's market and there is no room for the little fellow unless he is able to combine with other concerns. Competition is probably keener in Buenos Aires than in any other paper market in the world. In normal times every big manufacturer and paper export house in the world is represented by direct agencies or commission merchants who are actively engaged in pushing sales. German, English, French, Swedish, Norwegian, Italian, Spanish, Dutch, Japanese, and American paper is on the market, and that from each country is in competition with all the others. A large buyer is visited by dozens of

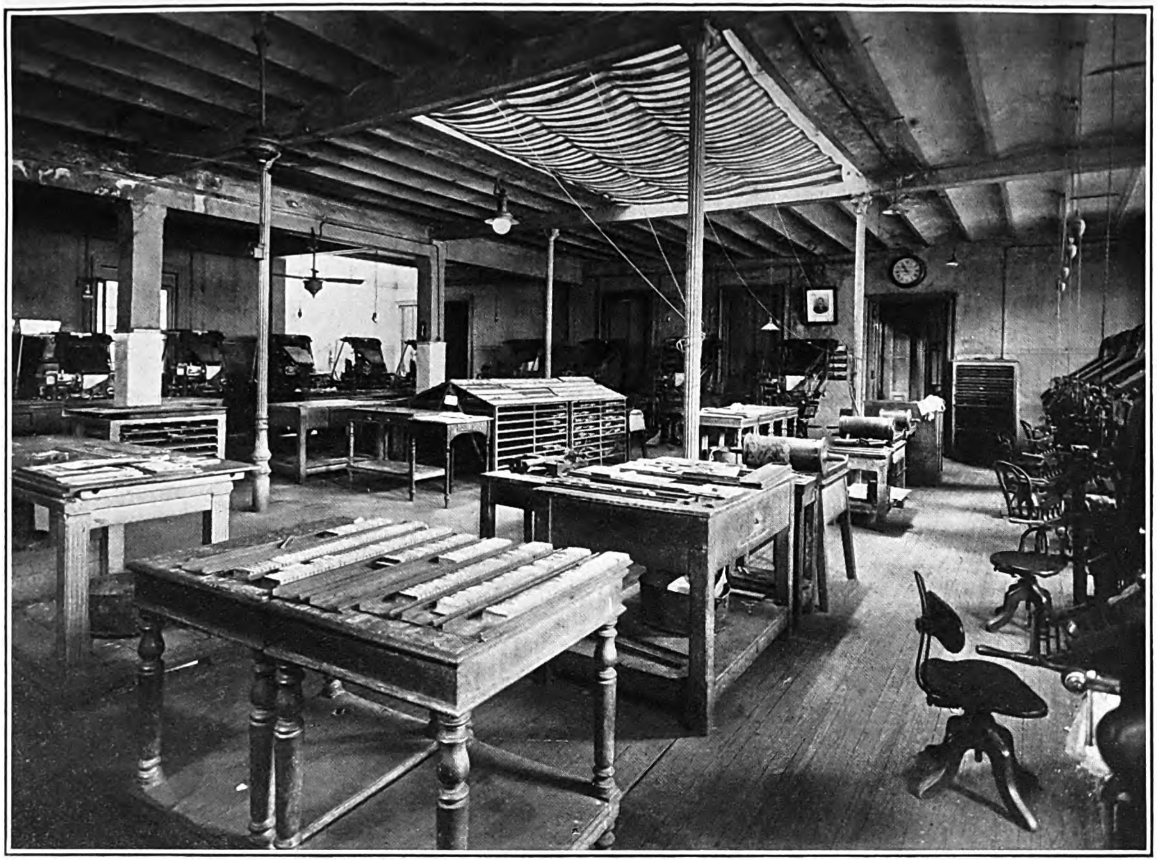

FIG. 4.—COMPOSING ROOM, LA NACIÓN, BUENOS AIRES.

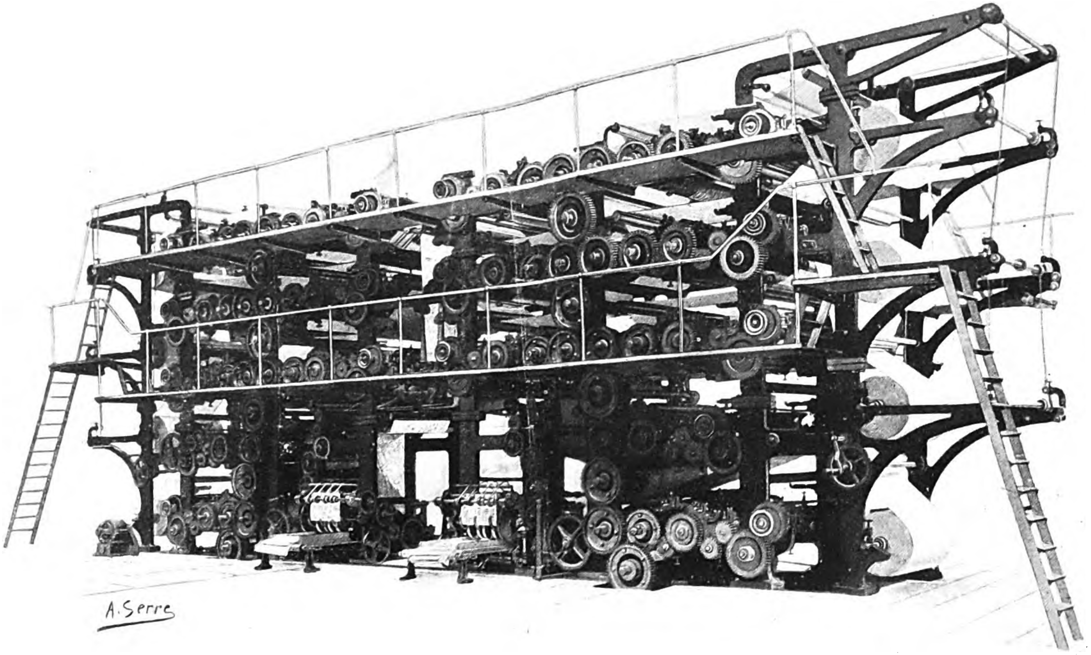

FIG. 5.—MARINONI (FRENCH) PRESS USED BY LA NACIÓN.

salesmen every week, and orders are generally placed with the mills that can give the best prices and the greatest facilities.

The best advice that can be given to an American manufacturer who is not already represented in Argentina is that he should endeavor to place the sale of his goods in the hands of one of the big American concerns. The two wholesale houses already established in Buenos Aires have a large trade and push the sale of American goods. Their large capital and splendid organization give them a commanding position in the trade. If these concerns have already taken up the sale of competitive lines, an alternative plan is to secure representation through one of the American export paper houses or commission merchants that deal in paper exclusively. There are four large concerns having branch offices in Buenos Aires, and each represents a dozen or more American mills. While all of these are paper merchants primarily, and buy the paper that they sell wherever they can obtain it cheapest, they also represent a number of mills exclusively.

If a manufacturer fails to make an arrangement in either of these ways there are still other methods that can be adopted. One is to place the representation with a house that is also handling paper from European mills. There are several concerns that have been making efforts to secure the representation of American mills, especially since the war. This plan is not recommended except as a last recourse. While some sales will probably follow, little permanent business can be obtained in this way. It is a difficult undertaking to sell American paper in normal times in Buenos Aires, and a firm working on a commission basis can not be expected to give the necessary time and attention to develop a business for American concerns when it can secure larger returns by selling paper made by European mills.

If it is impossible to place his line with a house already established in Buenos Aires the manufacturer is confronted with the necessity of opening his own office, either individually or in connection with manufacturers of noncompeting lines. Granted that his product can be sold in Buenos Aires at a price to meet foreign competition and that he has ample capital to finance his operations, there remains the great difficulty of finding a suitable man to place in charge of the business. The writer is positive that there are few available men in the United States who are qualified to represent successfully American paper manufacturers in Buenos Aires. Not only is a thorough technical knowledge of paper manufacturing and salesmanship required, but the ability to speak and write Spanish is absolutely necessary. The paper buyers in Buenos Aires are busy men whose purchases run into hundreds of thousands of dollars annually, and they have little time to devote to salesmen who can not present their propositions in idiomatic Spanish. Many of the paper salesmen in Buenos Aires speak Italian and French in addition to Spanish and, therefore, have an advantage in dealing with Italian and French houses.

The expenses of a branch house in Buenos Aires will largely depend upon the salary that is paid the representative. No man should be sent to the country who is not capable of earning $5,000 per annum, as he will be unable to live comfortably and do the entertaining that is necessary on a smaller amount. Office expenses are somewhat higher than in New York. A suitable office in a modern building will cost from $40 to $75 per month. A competent stenographer can be obtained for $125 per month. Licenses for traveling in the interior will probably amount to $600 per annum. The total expenses will not fall much short of $10,000 per annum.

The sending of traveling salesmen to Argentina is not recommended except in the case of specialties that it is desired to introduce on the market. It will take the ordinary salesman from two to three months to become acquainted with the buyers and market conditions, and during this period he will be unable to make sufficient sales to pay his expenses. In this connection the experience of the representative of a New York paper house is illuminating. He came to Buenos Aires with the object of establishing a branch office of his concern, which was already well and favorably known to the trade. He was particularly well qualified, speaking English, French, and Spanish fluently. For the first 60 days he was unable to obtain a single order, although he was most active in calling on the trade. He was getting desperate and had about decided to cable his firm that he was returning home when the tide turned. In the third month his sales amounted to more than $6,000 and in the fourth he sold $30,000 worth of goods.

Few direct orders result from correspondence, and the sending of samples and circulars is useless unless there is a local representative on the ground to follow up the advertising. There are exceptions, however, and one manufacturer making high-grade bond and ledger paper has obtained several substantial orders from this sales method. As a rule the large buyers are too busy to pay much attention to offers received through the mails.

No manufacturer should consider the question of exporting to Argentina unless his correspondence and shipping departments are well organized to take care of the business. The greatest care is necessary in filling orders, and the slightest mistake is likely to cause the purchaser to refuse the shipment.

COMMERCIAL TRAVELERS' LICENSES.

As pointed out previously in this report, the only cities in Argentina of importance as jobbing centers for paper and paper products are Buenos Aires and Rosario. In other cities, however, such as Bahia Blanca, Cordoba, Santa Fe, Tucuman, and Mendoza, there are a few firms that import paper direct. A salesman visiting Argentine cities outside of Buenos Aires will be compelled to take out a "patente" or license, and the failure to secure such a license will subject him to a heavy fine and considerable annoyance. In many cases the payment is avoided by making arrangements with local houses, having travelers in the interior, to have orders taken in the name of their licensed salesman. Some salesmen for American concerns visit merchants in the smaller cities for the purpose of talking over conditions, and if they find that they can make sales, sufficiently large to warrant the payment of the tax, they take out the license.

The license fees expressed in Argentine paper pesos (1 peso equals $0.4245 United States currency) charged by the various Provinces are as follows:

Federal District, including city of Buenos Aires—500 pesos.

Province of Buenos Aires (principal cities, Bahia Blanca and La Plata)—All commercial travelers pay an annual license fee of 400 pesos.

Province of Santa Fe (principal cities Rosario and Santa Fe)—Same as in the Province of Buenos Aires.

Province of Entre Rios—A license fee of 600 pesos; if taken out after June 30, 300 pesos to the end of the year.

Province of Cordoba (principal city, Cordoba)—An annual license fee of 400 pesos; if taken out after June 30, 200 pesos to the end of the year.

Provinces of Santiago del Estero and San Luis—An annual license fee of 300 pesos.

Province of Salta—A sliding scale for different classes of merchandise, ranging from 1,000 pesos per annum for cloth and dress materials or sugar and 800 pesos for ready-made clothing, down to 100 pesos for soap and candles and 60 pesos for empty sacks. All licenses in this Province can be taken out semiannually.

Province of San Juan—The licenses issued are in four-month periods, namely, from January to April, 400 pesos; from May to August, 300 pesos; from September to December, 200 pesos; so that all classes of firms offering goods the whole year round have to pay a total of 900 pesos per annum.

Province of Mendoza (principal city, Mendoza)—From January to April, 600 pesos; May to August, 500 pesos; September to December, 400 pesos; a total of 1,500 pesos per annum.

Province of Corrientes—Commercial travelers who sell solely to business houses must pay a license fee of 600 pesos per annum; those who sell to private houses, 1,000 pesos.

Province of Jujuy—Commercial travelers representing one firm, 200 pesos per annum; for each additional firm represented, 100 pesos.

Province of La Rioja—An annual license fee of 200 pesos; after June 30, 100 pesos to the end of the year.

National Territories—An annual license fee of 100 pesos.

FUTURE OF AMERICAN PAPER TRADE IN ARGENTINA.

The future of American exports of paper and paper products to Argentina will largely depend upon conditions in Europe after the end of the war. If the old scale of wages and hours is resumed and the freight service from Continental ports is as frequent and cheap as it was several years ago, it would seem that European countries would be in a better position than the United States to serve Argentina. Certainly conditions in the United States do not indicate a lowering of the wage scale of paper operatives to meet those that existed in Europe before the war. Germany will in all probability regain its place as the leading nation exporting to Argentina, but several years may elapse before this takes place. At the present time there is an intense feeling of opposition to all German interests, especially by consumers of paper whose interests are associated with those of the Entente Allies, but this feeling will give way in time to the low prices and excellent service that have been responsible for the preponderance of German exports. Hamburg is a natural center for the assembling of paper for exportation to all parts of the world. Not only is Germany a great paper-manufacturing country itself, but Hamburg is close enough to Norway, Sweden, and the Netherlands to exercise an important influence upon the sales of paper from those countries. Much stronger competition from the Scandinavian countries must be expected in the future. The war has awakened both Norway and Sweden to the importance of the South American paper market, and a number of mills and export houses are represented in Buenos Aires. The mills in those countries are constantly being improved, and their product is reaching a point where it compares very favorably with that of the principal paper-making countries. With their enormous supplies of wood pulp and cheap labor they are becoming formidable competitors in news print and sulphite bonds, two grades of paper in which American manufacturers have always led.

The success of the two American wholesale paper houses in Buenos Aires seems to be assured. Both of these concerns have ample capital with which to do business and are organized in a manner that is most efficient. They have made a very favorable impression on the trade during the difficult years of the war and have shown a spirit of liberality that will inevitably be felt in the years to come. While both concerns are loyal in their support of American manufacturers and make every effort to sell American goods, they are fully alive to the necessity of meeting competition by selling paper of European manufacture with which American manufacturers can not compete. They import strawboard from the Netherlands, pulp board from Sweden, and handle paper made by the local mills. The greater part of their stock of envelopes is made for them by local manufacturers from paper imported from the United States.

MARKET FOR PARTICULAR LINES OF PAPER.

News print.—The annual consumption of news print, in normal times, is about 33,000 metric tons, of which about 28,000 tons are imported and 5,000 tons manufactured in the country. The quantity of both imported and domestic paper varies from year to year according to the business conditions of the country, which have an effect upon the circulations and advertising patronage of the newspapers. In 1913, for instance, when the country was quite prosperous, the imports reached 30,749 tons. In 1914 they decreased to 23,919 tons, but in 1916 rose to 29,567 tons. In the latter year the imports were above normal on account of the fact that stocks had been permitted to run low during the first two years of the war. The importation for 1917 will probably be lower in volume than for the previous year because of the scarcity of shipping facilities and the economies in the consumption of paper that are being practiced by the newspapers. Freight rates on paper in rolls, which have been steadily mounting higher and higher as the war has progressed, were quoted at $75 per ton in the summer of 1917, more than three times the normal rates and equal in value to the f. o. b. price of the paper. One large publisher was able to contract for space on sailing vessels at $40 per ton.

On July 1, 1917, the existing stock of roll paper in the country was about 8,000 tons, a supply hardly sufficient for three months. The publishers began to fear that they would not be able to obtain sufficient paper for their needs. They were already practicing considerable economy in the use of paper, but still further restrictions were placed in effect. Both the number of pages and the circulations were reduced. The situation became so acute that the publishers appealed to the Federal Government, which had already shown its disposition to aid them by abolishing the duties on paper for their use. The Government was asked to bring 1,000 tons of news print per month in the transports that were being sent to the United States for coal. At the time of the writing of this report (July, 1917) a definite decision had not been reached, but it is almost certain that the request of the newspapers will be granted provided they can agree among themselves as to the allotment of tonnage.

Previous to the war news print was imported from three countries—the United States, Norway, and Sweden. Germany is shown in the Argentine statistics as one of the principal exporting countries, but practically all of the paper shipped from its ports was manufactured in Scandinavian mills. The United States exports comprised about 25 per cent of the total and more than 50 per cent of the roll paper. Practically all of this came from one company, which for a number of years has had a contract with La Prensa, of Buenos Aires, for its entire supply of paper. The latter comprises about one-third of all the paper consumed in the country. Very little news print in sheets came from the United States, as American manufacturers were unwilling to meet European competition in light weights and long terms. With the elimination of Germany from the market and the difficulties surrounding shipments from the Baltic, imports from the United States largely increased. In 1915 they amounted to 14,597 tons out of a total of 25,586 tons, and in 1916 to 23,107 tons out of a total of 29,567 tons.

The position that the United States gained in the roll news-print market before the war was due to the quality of the paper and the service that was rendered. As a rule the laid-down price of Scandinavian paper was at least 10 per cent lower than the American and the freight service was more frequent from European ports than from New York. Years of experience, however, had taught the big publishers that American paper was stronger, had a better finish and color, and was more suited to their needs than paper from any other country. The first of these qualities had a strong influence. As with the metropolitan dailies of the United States, the question of making early morning mails is important and publishers are unwilling to risk delays by using inferior paper that breaks on their presses and causes the loss of priceless minutes. The question of service was more important to the smaller newspapers. The representatives of the American manufacturers not only carried large stocks in Buenos Aires but they perfected their drayage arrangements so that they were able to make daily deliveries to the pressrooms of the number of rolls needed, thus making it unnecessary for the newspapers to carry large stocks on hand.

There have been two principal firms handling news print in rolls in Buenos Aires. One of these represented the largest manufacturer of news print in the United States for 11 years. The other (Serra Hermanos, an Italian firm) has handled news print to any considerable extent only since the beginning of the war. Another American house has contracts with a number of the smaller newspapers. In addition, there are a number of representatives of Norwegian and Swedish mills who carry no stock.

As a rule the publishers of Buenos Aires buy their paper at a price that includes delivery in their pressrooms. The notable exception to this is La Prensa, which has a direct contract with an American company at an f. o. b. New York price. In recent years contracts have had a clause that permits the dealer to charge all freight in excess of a stipulated rate. In the early summer of 1917 the prevailing price for roll news print, delivered in Buenos Aires, was 14 cents Argentine gold per kilo ($0.061 per pound). Usual terms of payment are 30 days.

Of the 33,000 tons consumed in the country each year, some 28,000 tons are roll paper, used by the large newspapers, and 5,000 tons in sheets, used by the small newspapers and printers. The consumption of roll paper by the principal newspapers is as follows: La Prensa, 10,000 tons; La Nación, 7,000 tons; La Razón, 2,400 tons; La Época, 1,200 tons; La Argentina, 1,000 tons; La Patria degli Italiani, 900 tons; La Unión, 900 tons; Ultima Hora, 800 tons; Vanguardia, 600 tons; Giornale d'Italia, 400 tons; Boletín Oficial and Boletín Judicial, 275 tons; La Mañana, 275 tons; Crítica, 275 tons; El Diario Español, 225 tons; Deutsche La Plata Zeitung, 200 tons; the Standard, 200 tons; Il Roma, 200 tons; the Buenos Aires Herald, 150 tons; La Gaceta, 150 tons; Idea Nacional, 150 tons; Le Courrier de la Plata, 125 tons; El Nacional, 125 tons; newspapers in the interior, 2,500 tons.

The width of the rolls ranges from 17 to 70 inches, according to the size of the pages and the type of press that is used.

All of the wholesalers in Buenos Aires handle news print in sheets for the smaller newspapers and printers and for sale as wrapping paper. Before the war practically all of this paper came from Scandinavian countries, and while the United States has increased its sales in the past few years there is little prospect of the business being retained after the war unless American manufacturers meet the European competition in the matter of weights. The paper for which there is the greatest demand weighs 46 grams to the square meter, equivalent to American paper of 28 pounds basis (24 by 36 inches weighing 28 pounds to a ream of 500 sheets), and no extra charge for this weight is made by European mills. The sizes for which there is the greatest demand are: "Courrier," 64 by 90 centimeters (25¼ by 35.4 inches); "Pueblo," 72 by 104 centimeters (28¼ by 41 inches); and "Tribuna," 81 by 116 centimeters (31.7 by 45.6 inches). Other sizes for which there is a smaller demand are 52 by 72 centimeters (20.4 by 28.3 inches), 64 by 84 centimeters (25¼ by 33 inches), and 74 by 110 centimeters (29⅛ by 43¼ inches). Practically all of the smaller newspapers in the interior are printed on either "Pueblo" or "Tribuna." The names of these sizes were taken from the sizes used by the early newspapers of Argentina.

The use of news print for wrapping paper is growing on account of the high prices of other grades that are protected by the tariff.

There is no duty on news print that weighs between 45 and 55 grams per square meter. Paper weighing more or less is assessed as printing paper and pays a duty of 3 cents Argentine gold per kilo ($0.013 per pound). Up to February 17, 1915, there was a duty of 2 cents Argentine gold ($0.0087 per pound) on paper that came under this first classification, but this was cut in half in 1915 and entirely removed February 21, 1917.

News print made in Argentina is higher in price than the imported article. Only two of the local mills (La Argentina and El Fenix) manufacture it, and only one of these (La Argentina) supplies paper in rolls. On account of their limited production and the necessity of importing all raw material from abroad, they are unable to compete with the foreign mills, especially now that the protection afforded by the tariff has been removed. Their present prices are about 3 cents Argentine gold per kilo higher than the price of imported paper of the same grade. Some of the newspapers, however, are willing to pay this higher price for a portion of their supply in order to encourage the local manufacture and have the mills to fall back upon in case of a shortage of paper from abroad.

Book and similar papers.—Almost every grade of paper that is used in the United States or Europe for printing pamphlets, books, magazines, and for job work, is also used in Argentina, but by far the largest part of the paper used for work of this description is what is known as "papel para obras," a combined printing and writing paper that may be described as a cross between the better grades of machine finish and the cheaper grades of flat writings as produced in the United States. The annual consumption is estimated at some 16,000 metric tons, valued in normal times at about $2,000,000. Before the war more than one-half of this paper came from Germany, making up the greater part of the importations of more than a million dollars' worth of printing paper from that country. In 1913 the wholesale price of German paper in Buenos Aires was about 6½ cents per pound. As it was subject to a duty of 1⅓ cents a pound and the average freight rate was about 1 cent per pound, the cost to the wholesaler, f. o. b. port of shipment, was a trifle more than 4 cents per pound. Local manufacturers were protected by the tariff and were able to meet the foreign competition, but it is stated that there was very little profit at this price. The cutting off of imports from Germany greatly stimulated the local manufacture. Prices have more than doubled in the last three years, and in July, 1917, domestic paper of the first quality was quoted at 36 cents Argentine gold per kilo (15.8 cents per pound). A second grade was sold for 2 cents a kilo less.

Samples Nos. 10 to 13, inclusive (see p. 160), show paper that is manufactured by four of the local mills and closely resembles the paper that was formerly imported from Germany. As will be seen by an examination of the samples, the first quality is a clean white paper, free from defects, and with a surface that admits the use of pen and ink. The second quality is darker in color and the finish is not so good. It is used not only for the printing of books and magazines but also for cheap blank books, writing pads, letterheads, invoices, receipts, bank-deposit slips, and similar work. Nearly all of the small printers, and many of the large ones, use it exclusively for all the work that they produce, and as it meets all general requirements it greatly simplifies their purchases.

The attention of American manufacturers is directed to the importance of producing a paper that will meet the German and local competition. Since the beginning of the war large quantities of machine finish and flat writings have been imported from the United

States to take the place of the combined printing and writing paper, but these substitutes are not at all satisfactory and their use can be regarded as only temporary. It will be necessary to produce a paper that can be sold at less than 4 cents a pound, f. o. b. New York, in order to obtain any considerable share of the business.

The sale of both machine-finish and supercalendered paper has increased in the last three years, and there will be a larger sale for both of these grades after the war than there was before. Printers and publishers have found that they can be substituted for more expensive papers. When it is realized, however, that in 1913, when the paper imports were the largest in the history of the country, the total value of all printing paper received from the United States was less than $10,000, the conclusion must be drawn that unless American manufacturers make the paper for which there is the greatest demand they can not expect to take any real part in the sales to Argentine consumers.

Coated paper is used for the printing of magazines and books and came principally from Germany before the war. A grade that had the largest sale had a dark clay filler that made it opaque and was particularly desirable in the lighter weights. It was not strong, but it had a very smooth surface that gave excellent results in the printing of halftones and three-color plates. In 1913 it was sold in Buenos Aires for 18 cents Argentine gold per kilo ($0.079 per pound). The duty was $0.013 and the freight rate about $0.01 per pound, making the wholesale price about $0.054 per pound, f. o. b. port of shipment. A small quantity of coated paper is made by the local mills, but it is poor in quality and can not compete in normal times with imported paper. Medium-grade paper and the most expensive paper are also used to a smaller extent. Two popular weeklies, whose ciruclations are around the 100,000 mark, use paper that costs in normal times $0.09 a pound, delivered in Buenos Aires. The consumption of one of these (Caras y Caretas) was 372 metric tons in 1916. Two monthlies use the highest-grade paper that they can buy. Since the war all of the coated paper used in the country has been imported from the United States, and consumers seem to be pleased with the quality although the price is considerably higher than that which they formerly paid. Two publishers, who are the largest consumers of coated paper in the country, spoke in the highest terms of the treatment they had received from American manufacturers during the last few years and stated that if the prices are anywhere near those of European competitors after normal conditions are restored they will continue to use American paper. The general impression prevails among dealers that American coated paper, especially in the better grades, will be able to hold its own in the future.

Halftone news is used by several magazines and is imported in sheets and rolls. One of the largest consumers (Caras y Caretas) used 795 metric tons in 1916, all of which was manufactured in the country. Recently Scandinavian manufacturers have offered a very good grade of this paper at 65s. per 100 kilos ($0.07 per pound), c. i. f. Buenos Aires, while the present price of American paper is $0.065 per pound, f. o. b. New York.

Antique finish and laid papers have a small sale and are used principally for the printing of books. British manufacturers are strong

in these lines, and one firm that makes a specialty of handling high-grade British book papers has built up a considerable business.

Paper for printing bank notes comes from Italy. The Government has a contract with an Italian firm, which has several years to run, for a handmade paper containing the value of each bill watermarked in its center. Paper for lottery tickets is made by the same concern.

Three sizes are principally used in the cheap grades of printing paper—28.3 by 41 inches, 29⅛ by 43¼ inches, and 32¼ by 46½ inches. The weights are 48, 60, 72, 84, and 95 grams to a square meter, which are equivalent to from 55 to 154 pounds per ream of 500 sheets in the different sizes. Other sizes used, especially for letterheads and writing paper, are 18⅛ by 22⅞ inches and 18⅛ by 28$\frac{3}{10}$ inches. Paper weighing 14.3 and 17.6 pounds to a ream of 500 sheets in the first size, and 17$\frac{6}{10}$ and 22 pounds in the second, have the largest sale. In coated paper the sizes are 25½ by 37$\frac{8}{10}$ inches, 29⅛ by 43¼ inches, and 32¼ by 46½ inches. Weights run from 55 to 176 pounds per ream of 500 sheets.

At the present time all book papers from the United States are packed in wooden cases, but in normal times a slight economy is effected by packing machine-finish paper in bales. A lower freight rate is secured for paper in this way, but is almost offset by the higher duties. Paper in bales is assessed on the gross weight of the bale and an allowance of 4 per cent made for tare, which does not cover the weight of the packing. Coated paper should always be packed in cases. Book papers should be ream wrapped and heavy coated paper should be wrapped in half-ream packages. American paper is being sold at present without being wrapped, but when European paper is to be obtained the former will have to be wrapped to meet the competition. No extra charge is made by the European mills for wrapping or baling, but they charge about 2 marks per 100 kilos (220 pounds) for wooden cases.

Writing paper.—Combined printing and writing paper as previously described comprises a large part of the paper that is used for writing purposes, but better grades are used for correspondence and are imported principally from Europe. The imports include sulphite bonds, all-rag superfine writings, mixed wood and rag flat writings, genuine linens and ledgers, handmade paper, and fancy correspondence papers of every description. Ninety per cent of the imports consist of white paper, as this pays a duty of 3 cents Argentine gold per kilo ($0.013 per pound), while colored paper imported in sizes larger than 12¾ by 17 inches is assessed 10 cents Argentine gold per kilo ($0.056 per pound, including the surtax of 7 per cent). The tariff makes no distincti tween different grades of white paper, and this has a tende crease the importations of the better grades.

In 1913 the imports were valued at $52 Italy, of which 44 per cent came from Germany, 11 per cent from Great Britain, and Imports from Germany consisted 18 4 writing paper in the small sizes, sulphite bonds made in Norway and already made up in papeteries or to be ponding envelopes by local dealers. Imports consisted of high-grade linen and ledger papers, those from Italy of cheap rag paper and high-grade handmade paper for bank notes, and those from Spain of cheap writings and handmade paper. Imports from the United States, which were valued at less than $15,000, were made up almost entirely of cheap sulphite bonds. A large part of the imported paper is ruled, as there is no difference in the duties between ruled and unruled paper and local rulers are unable to compete with the prices made by the mills.

Sulphite bonds are used for letterheads and general business correspondence and seem to be growing in favor. This paper was formerly imported from Germany and the United States, but paper from the first of these countries was made in Norway or Sweden. American paper is regarded as better and cheaper than that from any other country, and the only reasons why it did not have a larger sale were the lack of distributing facilities and the fact that the selling campaigns of the American manufacturers were not so active as those of their competitors. Now that it is well established on the market and is stocked by all of the wholesale dealers in the country, there is no reason why it should not continue to be sold in the future as well as at present. During the last three years German wholesalers have bought large quantities of American bonds, and an order of 500 tons is not considered particularly large. The paper that has the greatest sale cost from $0.055 to $0.065 per pound, f. o. b. New York, before the war, and has increased in price 100 per cent in the past two years.

In genuine bonds, linen, and ledger paper, English manufacturers have been favored more by reason of their quality than their price. A good grade of linen paper that costs $0.15 per pound, f. o. b. factory, is sold by a firm that specializes in high-grade English papers. There is a demand for even better grades, and paper costing $0.25 per pound is stocked by this firm. German paper made of cotton rags, closely imitating the English paper and selling at one-half the price, was cutting in on the sale of the genuine article before the war.

Handmade paper is used for notarial paper and comes from Spain and Italy. A considerable part of the imports from the first country consists of paper that is stamped by the Government and sold for all legal documents, leases, powers of attorney, incorporations, etc. The Government has a contract with the Spanish mill that has furnished the paper for 25 years; this, however, will expire in 1918. Th[illegible]ual consumption is 3,800,000 sheets, 12¾ by 17 inches in size. [illegible]er is watermarked with the coat of arms of the Republic in the cen[illegible] [illegible]wn by sample No. 64.

Papeteries a[illegible]ually by the wealthy classes for correspondence purpos[illegible] many different styles and colors. Germany supp[illegible] were imported, but F[illegible]ance and G[illegible] business. One German manufactur[illegible], Coblentz, was particularly strong in this [illegible], showed more than a thousand different styles, rang[illegible] $0.08 to $2 per box. Since the war there has been [illegible] sale of French papeteries. Samples Nos. 40 to 43, inclusive, s[illegible] four styles, costing from 1.10 to 1.75 francs ($0.22 to $0.35 per box). Large stationery dealers imported paper and envelopes for papeteries separately in order to save duties and boxed them in the country in either domestic or imported boxes. Sample No. 48 shows a cheap papeterie that was manufactured in this way. The cost before the war was $0.14 and the retail selling price 80 centavos ($0.33). The present retail price is 1.50 silver pesos ($0.64). The sale of American papeteries has largely increased since the war, and they are now stocked by all of the principal stationery dealers. They are sold by the wholesale paper houses, and one manufacturer is represented by an exclusive agent. They have met with ready acceptance by the public, and there is no reason why their sale should not be continued after peace is restored.

Writing pads find a ready sale among the middle classes. They are manufactured in the country by nearly all of the large stationers from imported or domestic paper and bear the makers' advertisements upon the blotter. Both letter and note sizes are used, but the principal demand is for the former Pads are also imported from Germany and England in normal times.

Writing paper for commercial uses is imported in two sizes—$18\frac{1}{8}$ by $22\frac{7}{8}$ and $18\frac{1}{8}$ by $28\frac{3}{10}$ inches. The first is used for letterheads and cuts 4 sheets 9 by $11\frac{3}{10}$ inches. The second is used for legal purposes and cuts 4 sheets 9 by $14\frac{1}{10}$ inches. Preferred weights in the first size are $14\frac{3}{10}$ and $17\frac{6}{10}$ pounds to a ream of 500 sheets, and in the second $17\frac{6}{10}$ and 22 pounds. The English and Continental mills make no extra charge for the light weights.

Wrapping paper.—The importation of ordinary wrapping paper is practically prohibited by the duty of 8 cents Argentine gold per kilo ($0.035 per pound). Some few firms import high-grade krafts in light weights for their own use, but the quantity is very small. The manufacture of wrapping paper is the principal business of the local mills in normal times, as the protection afforded by the tariff practically gives them a monopoly. Prices are not based on the cost of manufacture, but rather on the laid-down cost of foreign paper. In some instances prices are higher for the domestic than the imported, but if the latter is brought in to any extent the Argentine manufacturers reduce their prices to meet the competition. In the very cheap grades prices have a closer relation to the manufacturing cost and are also affected by the cost of imported news print, which is admitted free of duty.

About one-third of the wrapping paper manufactured in the country consists of "papel de estraza," or bogus wrapping, which is shown by sample No. 6. Materials used consist of old news paper, waste paper, rags, and imported ground wood pulp. The price in normal times is 20 centavos per kilo ($0.038 per pound), but at present it is 100 per cent higher. This paper is principally used by the small grocers in the interior and is sold by a dozen or more paper dealers who specialize in wrappings. The size most generally used is $13\frac{1}{2}$ by 18 inches. Sheets are folded once and gathered in hands, each hand containing 5 or more sheets. They are then packed in bales containing about 35 pounds each. The work of cutting, folding, and baling is done at the paper mills, where men and girls are employed for this work.

Sample No. 2 shows 19 varieties of paper that have a large sale among the better classes of retail stores. Among these varieties are manila, kraft, and glazed and unglazed paper—the last two in several qualities. All of the mills make practically the same grades. Prices range from 60 centavos per kilo ($0.116 per pound) for manila and kraft to 50 centavos per kilo ($0.096 per pound) for the unglazed paper. These prices are about 50 per cent above normal. Sizes in all grades are 31.44 by 47.16 inches, and the weights from 55 to 120 grams per square meter.

News print is growing in favor for use as wrapping paper, as it is now the cheapest paper to be obtained in Argentina. It is used principally by druggists, stationers, bakers, and confectioners, who buy the paper in large sheets and cut it to the sizes desired. All of the sizes that are imported for the use of printers and newspapers find ready sale as wrapping paper. Weights range from 45 to 55 grams per square meter in order that the paper may be declared as "papel para diarios" (paper for newspapers) in passing through the customhouse.

Colored tissue paper in very cheap grades is used for wrapping wine bottles and also for decorative purposes. It is made by the local mills but is also imported from Germany and Sweden. The same duty is assessed as on wrapping paper. The price of the local mills in July, 1917, was 35 cents Argentine gold per kilo ($0.153 per pound). The size is 24.36 by 33 inches, and 10 reams weigh 6 kilos (13.2 pounds).

Practically the only grades of wrapping paper that are imported and that go to make up the imports of some $100,000 per annum, in normal times, are parchments, glassine, and grease-proof papers. Before the war these grades came from all European countries, but Germany was the principal source of supply. As in the case of other varieties of paper, German exports include manufactures of other countries.

Glassine paper is extensively used in the bakery and confectionery trades. In 1913 one of the local wholesalers purchased glassine from both the United States and Norway similar to sample No. 8. The American paper cost $0.095 per pound f. o. b. steamer New York, and the Norwegian $0.093 per pound c. i. f. Buenos Aires. In 1916 American paper of similar grade was quoted at $0.22 per pound and the Norwegian at $0.173 per pound. In the summer of 1917 American paper was obtainable at $0.16 and the Norwegian (sample No. 8) at £118 per 1,000 kilos ($0.26 per pound) f. o. b. London. Parchment paper is also made in the country, as shown by sample No. 7. The present price is $0.174 per pound.

Butter wraps are principally imported from France. Representatives of a French manufacturer (Maison Montgolfier Frères, Paris) carry a stock in Buenos Aires and supply the local creameries. Sizes are 19.6 by 25.5 inches and 29.5 by 39.3 inches. Weights in the first size are 33 pounds to a ream of 500 sheets and in the second 48.4 pounds to a ream of 500 sheets. Local dealers state that butter manufacturers prefer this paper to any other and that they have been unable to sell paper at much cheaper prices.

Waxed tissue paper is used for wrapping candy and comes from Germany in normal times. An American manufacturer has a representative in Buenos Aires, but sales have been small.

Strawboard, pulpboard, bristol board, etc.—Before the war American manufacturers were unable to meet the competition of European mills in any grade of cardboard, and, in consequence, their sales in Argentina were very small. In 1913, out of imports valued at $773,720, only $11,796 came from the United States. During the three years of the war the American share has more than tripled because of the difficulty of obtaining shipments from Europe, but it represents only a fraction of the consumption.

Cardboard used in Argentina may be grouped into two general classes—ordinary cardboard such as is used for making boxes and book covers, and better grades used for lithographic and printing purposes. In the first group are included strawboard, pulpboard, and gray and brown bogus board; and in the second, ivory board, bristol board, mill blanks, coated board, manila tag board, and index board. A considerable portion of the bristols is used in the manufacture of folding cartons by the printing and lithographing establishments. In nearly all of these grades there is some competition from the local mills, but even with the protection afforded by the tariff they are hardly able to compete with European manufacturers.

Strawboard, in normal times, is imported principally from Germany and the Netherlands. Since the war, practically all of the imports have come from the latter country, but some shipments have been received from Denmark and Sweden. Strawboard shown in sample No. 35 was imported from the Netherlands. In July, 1917, the c. i. f. price was $70 Argentine gold ($67.55) per metric ton. Previous to the war the same board was delivered in Buenos Aires for 122 marks ($29.03) per ton. The size is 27.5 by 39.3 inches, and the weights range from 4 to 40 sheets to each 10 kilos (22 pounds).

White pulpboard (sample No. 35) is principally received from the Scandinavian countries. Like strawboard, it has greatly increased in price since the beginning of the war. The normal c. i. f. price of $45 Argentine gold ($43.43 United States currency) per metric ton has risen to $124 per ton. Sizes and weights are the same as those of strawboard.

Gray and brown bogus board is manufactured from old newspapers and waste paper of every description by all the mills in the country. Since the increase in the price of strawboard local manufacturers have raised their prices to a figure that gives them an attractive profit, and they can sell all the board that they can produce. In July, 1917, their prices were 27 centavos silver per kilo ($0.052 per pound). Samples Nos. 33 and 34 fairly represent the domestic product.

Leatherboard (sample No. 35), which is used in the shoe industry, comes from Germany, Norway, and Sweden, in normal times. Recently there have been some heavy importations from the United States, and one order consisted of 200 tons. The price of Norwegian board in the summer of 1917 was $154.40 per metric ton c. i. f. Buenos Aires.

Ivory board and bristol board were imported almost entirely from Germany before the war. According to local dealers, no manufacturers in the world were able to meet the German competition in quality and price. Samples Nos. 58, 59, and 63 show three very popular grades that were imported in large quantities. No. 58 was sold in 1913 at 48 marks per 100 kilos ($0.052 per pound). No extra charge was made for the light weights. Sample No. 63 cost from 44 to 55 marks ($10.47 to $13.09) per 100 kilos, according to weights, and sample No. 59 cost 75 marks per 100 kilos ($0.081 per pound). All of these prices were f. o. b. Hamburg.

Cheap colored bristol is made in Argentina by four of the local mills, whose product is represented by sample No. 60. The present price of 32 cents Argentine gold per kilo ($0.14 per pound) for the light weights and 30 cents per kilo for the heavier weights has more than doubled within the last three years. The local mills also make a light-weight colored board, coated on one side, as shown in sample No. 61. The price has increased from 17 cents Argentine gold per kilo ($0.074 per pound) in 1913 to double this amount in 1917. Colored bristols were principally received from Germany and Austria before the war. Sample No. 62 was imported from the latter country and cost 75 francs per 100 kilos ($0.068 per pound) f. o. b. Hamburg. An additional charge of 5 francs per 100 kilos was made for the linen finish.

All white bristol used in Argentina is 19.65 by 25.54 inches in size and weighs from 35 to 90 kilos (77 to 198 pounds) per ream of 500 sheets. Colored boards are 22 by 29.86 inches and weigh the same as the white. Strawboard and pulpboard are shipped in bales containing 250 kilos (551 pounds) and bristol boards in wooden cases. For the latter the European mills charge 2 marks per 100 kilos for packing.

There is only a limited sale in Argentina for manila tag board, as tags are manufactured in the country on a very small scale. There is an even smaller sale for index board, as card indexes are not in such general use that supplies are manufactured in local plants.

Toilet paper.—The imports of toilet paper increased from $65,629 in 1913 to $97,280 in 1916, and in the latter year practically all the imports came from the United States. American toilet paper is now so well established on the market that it is believed it will continue to lead in the imports when European paper is again obtainable. For many years English paper was regarded as the best and imports from that country were larger than from any other. German dealers introduced a smaller and cheaper roll than had been sold by the English and gradually obtained control of the market. According to customs statistics for the five-year period from 1908 to 1912, 31 per cent of the imports came from England, 27 per cent from Germany, and 25 per cent from the United States. In 1913 Germany supplied 40 per cent, the United States 25 per cent, and England 19 per cent.

The demand in Argentina is almost entirely for paper in rolls, and very few stores stock paper in packages. Both plain and crêpe papers are to be found, and there is not much difference in their sales. The most popular size is a roll about 5 inches wide and from 3½ to 4 inches in diameter and weighing about half a pound. Before the war this paper was sold at 12 pesos ($5.10) per case of 100 rolls. The present wholesale price is 35 pesos ($14.88) per case. The retail price has been increased from $0.11 a roll to $0.25.

Toilet paper is sold by department stores, drug stores, hardware stores, stationery stores, and stores handling sanitary supplies. Many of the large dealers purchase paper through their representatives in the United States or Europe, or through commission merchants located in those countries, and only a small portion of the orders are placed in Buenos Aires. All of the wholesale paper houses in

Buenos Aires sell toilet paper, but their sales are small compared to those of the department stores and wholesale druggists. Dealers in the interior are supplied by the wholesalers of Buenos Aires.

No toilet paper is now manufactured in the country, but it is only a question of time when the local mills will begin to make it. The duty is $0.042 a pound, which is sufficient protection to enable the local manufacturers to compete with the imported article.

Cigarette paper.—No American cigarette paper is sold in Argentina, and there is very little prospect of any considerable sales unless war conditions in France and Spain should make importations from those countries so difficult that manufacturers would have to turn to the United States for their supplies. There are some 15 cigarette factories in the country, all of which use modern machinery. Large manufacturers state that it is almost impossible to change the grade of paper that is used without losing a large part of their consumers and that, therefore, price is not an important factor in their purchases of paper. Many of the principal concerns have been buying paper from the same mill for many years.

Practically all of the paper that is used in Argentina is imported in rolls containing about 1,500 meters each. It comes from France and Spain in almost equal quantities. The imports are valued at about $250,000 per annum. In the statistics for 1913 Germany is credited with imports valued at $66,354, but these consisted of French or Spanish paper shipped via Hamburg.

Paper in books to be used by smokers for making their own cigarettes is principally imported from France. These books retail for 5 and 10 centavos ($0.021 and $0.042) per package. There is no internal-revenue tax on cigarette paper.

Cover paper.—There is a very small sale for American cover paper, although it is carried in stock by both of the American wholesale houses. Magazines, catalogues, and books, for the most part, are covered with white coated or supercalendered stock, printed or lithographed in colors. For small books and pamphlets colored supercalendered paper in very light weights is used. This paper is made in the country by all the local mills, and imported paper can hardly compete on account of the high duties. An effort has been made by local representatives of American manufacturers to introduce fancy covers. The trade has been thoroughly canvassed and handsome sample books distributed, but only small sales have resulted.

Drawing paper.—Drawing paper comes principally from Italy, Great Britain, France, and Germany. American paper has no sale whatever, and in 1916, when the imports amounted to $17,483, and there was difficulty in obtaining paper from abroad, the imports from the United States were only $16. Dealers state that American paper can not compete with the European in either quality or price.

Tissue paper.—American tissue paper can not be sold in Argentina in normal times against the competition of German and British paper. Paper from either of those countries is better in quality and cheaper in price than the American. In 1913 imports from the United States amounted to only $1,725 out of a total of $105,255. Previous to the war some Japanese paper was imported, the imports from that country in 1913 amounting to $8,299.

Blotting paper.—American blotting paper has always held the lead in Argentina, despite the competition of paper from England and Germany. It is regarded as superior in quality and cheaper in price than that from any other country. It is sold by the German and English wholesalers as well as by the American concerns. The former buy direct from mills in the United States or through representatives of American paper export houses located in Buenos Aires.

The annual consumption amounts to about $80,000 per annum, all of which is imported. Local mills, however, are experimenting with the idea of making it in the country.

The standard size of sheet is 19 by 24 inches. All colors are sold, but the principal demand is for white, pink, and gray. Light weights are preferred on account of the duties of about $0.035 per pound.

Blotting paper is principally sold to consumers by stationers. It is not used to any considerable extent for advertising purposes. Printers buy some paper for making writing pads. For this purpose coated blotting is also used. Very thin paper is used by manufacturers of blank books and letter-copying books for interleaving indexes.

MARKET FOR MANUFACTURES OF PAPER.

Envelopes.—The protection afforded local manufacturers by the duty of $0.062 per pound on plain envelopes would seem to be an effective bar against their importation, but before the war European manufacturers were able to sell more than $200,000 worth of envelopes in Argentina every year. Nearly 60 per cent of the imports came from Germany and consisted of very cheap grades. Italian envelopes were equally cheap. Bond and linen envelopes, cloth-lined envelopes, and fancy envelopes came from Germany, Great Britain, and France. Imports from the United States amounted to about $5,000 per annum and have not increased since the war. There has been a large decline in imports during the last four years; in 1916 they were only one-fourth as large as in 1913.

As in other countries of South America, the greatest demand is for a large baronial envelope, about 5 by 6 inches in size, made of light-weight, colored paper and lithographed or printed on the inside to make it opaque. Before the war envelopes of this size were sold by German manufacturers for 1.80 marks ($0.43) per 1,000, f. o. b. Hamburg. As a thousand envelopes weighed 2 kilos (4.4 pounds) and the paper cost not less than $0.035 per pound, the manufacturer received $0.27 per 1,000 for making, boxing, and placing on board steamer. An extra charge was made for packing. The same envelope, without inside printing or lithographing, was sold for 1.50 marks ($0.37) per 1,000.

Since exports from Germany have been cut off and there has been difficulty in receiving shipments from other European countries, local manufacturers have prospered and have improved their plants to such an extent that it is believed they will be able to compete successfully with the imported envelopes when those are again obtainable. There are four manufacturers in Buenos Aires who operate 25 machines, nearly all of which were made in Germany. The largest of these firms has 14 machines. Within the last year four American machines, each capable of producing 50,000 envelopes per day, have been installed. The Government Mint has recently ordered an American machine for manufacturing envelopes to be sold by the post offices. All of the wholesale paper houses in Buenos Aires have the envelopes that they sell made by the local concerns from imported or domestic paper supplied by the former. The factory price for manufacturing the ordinary baronial envelope, without printed or lithographed interior, is 90 centavos ($0.37) per 1,000. One manufacturer states that when his new machinery is installed and the cost of glue and cardboard is restored to normal figures, he can produce envelopes for one-half of the present price. For printing the surface intended for the inside of baronial envelopes, 5 pesos ($2.12) per 1,000 sheets (each of which makes 15 envelopes) is charged. For lithographing the price is 10 pesos per 1,000. The price for making official sizes is 2 pesos ($0.83) per 1,000. The local factories employ girls who receive from 6 to 10 pesos ($2.55 to $4.25) per week of 48 hours.

An effort has been made by both of the American paper houses to sell commercial envelopes such as are used in the United States, but the effort has not been successful and practically all of their stock now consists of envelopes made for them by the local factories. Sample No. 46 shows the styles and sizes that have the greatest sale.

There are several small factories in Buenos Aires where manila catalogue envelopes are made by hand. One firm has 50 girls and women in its employ, and the work is done in the homes of the operatives.

There is a small sale in Buenos Aires for cloth-lined envelopes, which are imported from Germany and Great Britain. Sizes run from 3 by 10 to 9 by 12 inches.

Fancy envelopes were imported from Germany before the war and were used in the manufacture of cheap papeteries. Nearly all of these were lined with tissue or other lightweight paper, as shown by sample No. 48.

Printed books.—There is no duty on printed books entering Argentina, except advertising books and catalogues, and in consequence local printers are unable to compete with foreign printers in the production of the books that are sold in the largest quantities. As previously pointed out, all the materials used in the manufacture of books, including paper, ink, binder's cloth, cardboard, and thread, are subject to considerable duties. Books printed in the country consist principally of small editions where the question of time is more important than that of price.

In normal times the imports amount to more than a million dollars per annum, the greater part coming from Spain, Italy, and France. From Spain are received the books that form most of the reading matter of the general public. History, fiction, poetry, and textbooks are included, but by far the greater part of the imports consists of paper-bound novels that come from several large publishing houses of Barcelona. Some of these firms publish "libraries" containing more than 1,000 titles, most of which are highly sensational translations from the French. Translations of some of the works of English authors, such as Dickens, Scott, and Doyle, are also to be found. Detective stories are popular, and "dime novels" portraying the experiences of Nick Carter, Sherlock Holmes, and Jesse James are printed in Spain and sold in Argentina by the millions. It is estimated that 90 per cent of the stock of the book dealers of the country consists of cheap novels, while the remainder comprises books of a more serious character.

The large Italian population of Argentina is responsible for the heavy importations of books from Italy, which in 1913 were valued at $310,824. There are more than a dozen large bookstores and a great number of small stores in Buenos Aires that handle books in Italian almost exclusively. As in the case of books from Spain, the greater part of the imports consists of trashy fiction, but works of the Italian novelists, poets, historians, physicians, and scientists are sold to a considerable extent.

From France are received books in both French and Spanish, but those in the former language make up the bulk of the imports. The French colony is not very large, but French is taught to a considerable extent in the private schools and universities and is read and spoken by the educated classes. Novels, language methods, dictionaries, and scientific works are included among the imports. There are three firms of book dealers in Buenos Aires that specialize in books in French, and they are also carried in stock by all the principal stores.

Imports from Germany are divided between books in German and in Spanish. The former are imported for sale to the large German colony, and the latter consist of schoolbooks and scientific books that are printed for Buenos Aires publishers. Three book dealers handle German books exclusively.

Books in English come principally from England, although importations from the United States are increasing. The English colony in Argentina is many times larger than the American, and in consequence there is a much greater demand for works of British authors. Three bookstores in Buenos Aires, all owned by British citizens, carry a splendid stock of books in English. On the shelves are to be found many thousands of volumes from the principal publishers in Great Britain and the United States. The latest fiction is received within a month after publication, and the sale of 150 copies of a "best seller" is not unusual. A very popular line is the colonial edition of English publishers, in which all the late fiction is published. These books are bound in paper and retail at home for half a crown ($0.63). Another edition for which there is a large demand consists of novels that had a large sale before they were printed in cheap form. These are issued in boards and retail in England for a shilling ($0.24). The owner of one of the English bookstores lives in England and is, therefore, in close touch with the publishers. A considerable portion of his stock consists of books purchased at bargain sales. This is particularly true of the standard works and gift books. A large quantity of cheap fiction in English is sold by a British firm that has news stands in all the principal railway stations.

Books from the United States include technical and scientific books, novels and standard works of fiction, and schoolbooks. The first of these are purchased by doctors, engineers, lawyers, libraries, and scientific societies. There are several public libraries and some 40 or 50 excellent private libraries in Buenos Aires that have a good collection of books in English, to which additions are constantly being made. Dealers report a small but increasing demand for books relating to agriculture, stock raising, and dairying. There is a fair sale for books on electricity, scientific business management, and travel. The increased use of English is shown by the demand for Spanish-English dictionaries, language methods, and books that teach shorthand, bookkeeping, and commercial methods. Schoolbooks imported from the United States consist of those used in the several American institutes and business colleges, printed in English, and those in Spanish that are printed for Buenos Aires publishers. A few novels in Spanish printed in the United States have also been imported, but the quantity is so small as to be hardly worth mentioning.

Schoolbooks used in Argentina are printed in the country and also imported. Imported books consist of books by Argentine authors, published by Buenos Aires firms, but printed abroad on account of a lower price than can be met by the local printers. One of the large firms of publishers (Coni Hermanos) issues a very popular line of first, second, third, and fourth readers, which were printed in Germany before the war but are now being printed in the United States. There are five books in the series and the annual sale amounts to more than 800,000 copies. The books are well gotten up, bound in cloth, and illustrated in black and colors. A comparison of copies printed in Germany and in the United States shows a slight superiority in favor of the former, especially in the printing of the three-color plates. Editions printed in Germany were also more uniform. The publishers state that they have procured bids from all parts of the world for the printing of these books. Before the war German and Spanish firms were the cheapest, Italian second, English third, and American the most expensive. There was a difference of 33⅓ per cent between German and American prices, and in the last year the prices of the American printers have been further advanced.

Angel Estrada & Co., another large firm of publishers, have found it more satisfactory and economical to print their own books. They state that while there is a small difference in favor of the foreign printer the long delays and the many explanations that are necessary in order to get the books printed as desired offset the lower cost. This firm has published more than 400 books, the greater number of which are schoolbooks that are sold not only in Argentina but in all the South and Central American countries. The most popular of these is a line of primary readers that have an annual sale of about 100,000 copies each. One printing press, equipped with an automatic feeder, is run all the year on these readers. The binding is done by a local firm. Neither the printing nor the binding equals that of the books printed in Germany or the United States.

There are five large publishing firms and a number of small concerns in Buenos Aires whose principal business is the publishing of schoolbooks. Before their books can be used they must be approved by the national or local school authorities, and the principal of each school selects from the approved list those books that are to be used in his school. The Government furnishes books free to children whose parents are unable to purchase them.

In addition to the local publishers who sell to the retail bookstores, there are several wholesale dealers in Buenos Aires who import books from abroad and from whom the small dealers make their purchases. One of these is a branch of a French house that is represented in all the principal cities of Europe. One American publisher is represented by an agent in Buenos Aires who carries a stock of the English and Spanish books published by the firm. The business has not reached large proportions.

Blank books.—Manufacturers of blank books in Argentina are protected by a duty of $0.042 per pound for books bound in paper or pasteboard and $0.094 per pound for books bound in board, cloth, or half leather, but they are unable to compete in normal times with imported books, especially in the cheaper grades. In 1913 the imports were valued at $373,644, of which $172,883 came from Germany, $122,535 from Italy, and $49,937 from Great Britain. In 1914 they totaled $230,693, of which Germany supplied $127,223, Italy $51,356, and Great Britain $36,184. In 1915 the imports amounted to only $122,233, Italy supplying $52,820, Great Britain $32,589, and Germany $14,312. The average imports from the United States were less than $6,500 per annum. Italian-made books were the cheapest, both in quality and price, that entered the market. German books were slightly better in quality and higher in price. English books were of a much higher grade and were used principally by English banks and commercial houses and by the English-owned railways.

The elimination of German books from the market and the increased cost and difficulty of obtaining Italian books has stimulated local production, and Buenos Aires manufacturers are now supplying more than 90 per cent of all the blank books sold in the country. Whether they will be able to hold the business after the war will depend largely upon conditions in Europe. Their factories are equipped with the same kind of machinery that is used in Italy and Germany; their operatives have become more skillful in the last three years; and their product is protected by the tariff. On the other hand, wages in Europe were much lower before the war than they are in Argentina, and if the old scale is resumed after peace is restored local manufacturers will have difficulty in competing with European books. Under any circumstances it would seem that there is but little opportunity for the American manufacturer to increase permanently his sales in Argentina. Not only is his labor cost for ruling and binding higher than that of competing countries, but up to the present time American paper manufacturers have not been able to compete with European mills in the cheaper grades of writing paper such as are used in the greater part of the blank books sold in Argentina.

There are five firms in Buenos Aires manufacturing blank books for the jobbing trade, and several of the large stationers make the books that they sell. All the printers who have binderies manufacture special ruled books to order. The largest manufacturer has 250 employees and maintains a wholesale depot in Buenos Aires. The product is sold in the interior by salesmen of the jobbing houses. All styles of books made by this firm are shown in samples Nos. 50 to 56, inclusive.

The books that have the greatest sale are bound in pasteboard, black cloth, or cloth with leather backbone and corners. The most popular sizes are super royal (14½ by 19½ inches), royal (11.8 by 17.7 inches), medium (11 by 16½ inches), corona (9.4 by 13.1 inches), pot (5.9 by 16.3 inches), and clochet (5.4 by 14.5 inches). The last three sizes, especially in the cheaper grades, have a large sale. Sample No. 56, which sells at wholesale for $0.65, is very popular. Books in all sizes and bindings are made with journal, ledger, or plain rulings. Ledgers are printed with the heading "deber" and "haber," the Spanish equivalents of debit and credit. Domestic paper is principally used for the cheaper books and imported paper for the better grades. Small books are sewn with wire and large books with linen thread.

The Commercial Code prescribes the use of three books for each business firm—ledger, inventory, and press-copy book. These books must be stamped by the Government authorities before being used, and for this a fee of 2 centavos per leaf is charged.

The press-copy book is an important adjunct of trade, as its use is compulsory not only for the copying of letters but also for invoices. Many of the large firms make carbon copies of letters in view of the greater facility in filing and classifying correspondence, but copies must also be made in the press-copy books. Before the war practically all press books were imported from Italy or Germany, but during the last two years local manufacturers have been producing most of the books that have been sold. As in the case of other blank books, local manufacturers were ordinarily unable to compete with the cheap books produced abroad, although they were protected by the tariff. Sample No. 57 was manufactured in Italy. It is bound in imitation cloth, contains 500 pages of white paper, is indexed, and cost before the war 1.50 francs ($0.29) f. o. b. factory. The price has been increased 50 per cent in the last two years. Buenos Aires wholesale prices of Italian books similar to sample No. 56 are now as follows: Letter size, 500 sheets $0.81, 1,000 sheets $1.59; cap size, 500 sheets $1.15, 1,000 sheets $1.91. Books bound in cloth with leather backbone and corners are sold at the following wholesale prices: Letter size, 500 sheets $1.38, 1,000 sheets $2.31; cap size, 500 sheets $1.80, 1,000 sheets $3.19. It is estimated that these prices, which include duty, freight, and dealer's profit; are about 100 per cent higher than the factory prices. The sizes most generally used are 9 by 11.2 inches for letters and 9.45 by 14 inches for legal documents and invoices.

About one-third of the imports of blank books consist of memorandums and pocket note books. These come in many sizes and classes of binding, from a very cheap book covered with black oilcloth for the use of farmers and laborers to expensive books bound in leather and celluloid. Germany has been the principal source of supply for these books.

There is an increasing sale for loose-leaf books, especially in the smaller sizes, but the sale will never reach large proportions until their use is authorized by the Government. Many large firms use loose-leaf books for auxiliary ledgers, and they are also sold for price books and pocket memorandums. Several American manufacturers are represented by agents in Buenos Aires who seem to be achieving considerable success in the introduction of these books.

Printed, lithographed, and engraved work.—Despite the large printing, lithographing, and engraving establishments in Buenos Aires and their modern equipment for the production of all grades of work, Argentina, in normal times, imports annually more than a million and a half dollars' worth of printed, lithographed, and engraved work. The greater part of this consists of blank forms, stationery, etc., used by the railways and produced in Great Britain. The railways pay no duties on these supplies, and Argentine printers are unable to pay the duties on raw materials and compete in price with the foreign printers. Many of the large banks and commercial establishments have a part of their work done in Europe.

Post cards, calendars, albums, maps, oleographs, and pictures for framing come from Great Britain, Germany, France, Spain, and Switzerland. American concerns have heretofore been unable to meet prices of printers and engravers in those countries. There is always a small sale for American novelties in the shape of post cards, pictures, and advertising souvenirs, and the establishment of an agency for the sale of these articles would probably be successful.

Bank notes, postage stamps, bonds, and other Government values are produced at the Government Mint in Buenos Aires, which also does work for outside financial institutions.

Considerable quantities of labels are imported. These consist, for the most part, of labels to be used on merchandise that is imported in bulk and packed in Buenos Aires. Some of the big packing houses have their labels made in the United States.

Playing cards.—The annual consumption of playing cards is between 8,000 and 9,000 gross per annum. The imports in 1913 amounted to 2,915 gross, in 1914 to 1,654 gross, and in 1915 to 1,596 gross. In 1913, the last normal year, Spain furnished 1,275 gross, the United States 773 gross, France 750 gross, and the United Kingdom 114 gross.

All the cards used in the country, with the exception of those from the United States, have the Spanish faces and the decks consist of 48 cards. American cards are used by the American and English colonies, and in clubs where poker is played.

There are two local manufacturers who have an agreement as to prices and production. They make only one grade of card, as shown by sample No. 65. The wholesale price at present is 57.60 paper pesos ($24.48) per gross. This price includes the internal-revenue tax of 28.80 paper pesos ($12.24) per gross. The retail selling price is 60 centavos per pack.

Imported cards from Spain and France come from several factories and consist of cards costing from $9 to $12 per gross, f. o. b. factory. Three American manufacturers are represented in the cards from the United States. The most popular of the American cards cost $12 per gross, f. o. b. factory. Imported cards pay a duty of 10 pesos Argentine gold ($9.65) per gross and also the internal-revenue tax of 40 centavos paper ($0.17) per pack, whereas the internal tax on those of domestic production is only half that amount.

Paper boxes.—There is small opportunity for the sale of American paper boxes in Argentina, although the total imports were valued at nearly $100,000 in 1913. Since that time the local manufacturers have increased their production and improved their quality to such an extent that they are now able to compete with the foreign manufacturers in practically all grades with the exception of the most expensive boxes used by confectioners. They are protected by the tariff, which fixes the duty at about $0.084 per pound for ordinary pasteboard boxes, $0.21 per pound for confectioners' fancy boxes, and $0.56 per pound for boxes adorned with silk.

Imports, before the war, consisted of druggists' round, square, and oblong boxes and confectioners' fancy boxes. Most of these came from Germany, but French and English manufacturers were able to compete in some grades. The manufacturers of all three of these countries had a much lower cost for materials and labor that those of the United States, and the latter were unable to compete in prices. German boxes were sold at less than one-half the prices offered by American manufacturers.

The variety of fancy boxes used by the confectioners of Buenos Aires is amazing. Even at present, when supplies from Europe are difficult to obtain, they pack their sweets most attractively. In one of the largest stores more than a hundred different styles of containers were counted. These included boxes of every imaginable shape—round, square, oblong, and octagonal forming the greatest number. Many were adorned with ribbons, silk, or lace and had handsome lithographs pasted on the tops. Boxes of lacquered wood and baskets are also extensively used. Very shallow square or oblong boxes, which give the confectioner an opportunity to display his wares to the best advantage, have the greatest sale.

Paper sacks.—Paper sacks used in Argentina consist of three grades—a heavy sack made of "papel de estraza" or bogus wrapping paper, as shown by sample No. 32; ordinary grocery sacks, such as are used in the United States, as shown by sample No. 44; and confectioners' fancy sacks, as shown by sample No. 45. All of these grades are manufactured in the country, and the first and second can not be imported because of the duty of $0.049 per pound. Imports of the third grade amounted, normally, to about $60,000 per annum and came principally from Germany, France, and Great Britain. Imports have declined during the last three years, and in 1916 the entire imports were valued at only $15,000.

The heavy paper sacks made of bogus wrapping are used principally in the interior. They come in seven sizes, with a capacity of from 1 to 10 kilos (2.2 to 22 pounds). They are packed in bales of 50 kilos (110 pounds) and can be obtained assorted or one size to a bale. The price depends upon the price of the paper from which they are made. At present the factory price is 40 pesos per 100 kilos ($0.077 per pound), which is about double the normal price. The bale price is 45.15 pesos per 100 kilos, and the price for 3,000 kilos is 43 pesos per 100 kilos.

Grocery sacks are made from sulphite paper, glazed on one side and in two colors—pink and yellow. Sizes and prices are shown by sample No. 44. The prices as given are f. o. b. factory, and a discount of 11 per cent is allowed the large jobbers. Sacks are packed in bales containing from 10,000 of the smaller sizes to 3,000 of the larger. One manufacturer in Buenos Aires makes the square-bottom bags such as are used in the United States, and the prices are about 25 per cent higher than the prices shown on the samples.

Confectioners' sacks were imported in many different styles and
lors before the war, ranging from white sacks made out of parch-
lassine paper to sacks lithographed in several colors. The
acks were lined with white tissue or thin parchment
large confectionery stores in Buenos Aires,
red sacks direct from the European

manufacturers. Since the war these fancy sacks have been made in the country by hand.

Paper sacks of the ordinary grades are made by all the paper manufacturers. La Argentina has 18 machines at its Zarate plant, and other mills are equipped with from 1 to 6 machines each. There are several small manufacturers in Buenos Aires who have from 1 to 4 machines each, and a number of others who make fancy sacks by hand.

Wall paper.—The use of wall paper is general in the larger cities of Argentina, and there is a tendency to extend its use in the interior. It is not manufactured in the country, although the quantity consumed and the protection afforded by the tariff would seem to favor the establishment of a local factory. The imports vary from year to year according to the prosperity of the country and the amount of building. In 1913 they were valued at $254,454, which is the highest figure that has been reached. Since the war the quantity has been less, but this has been offset by the increase in prices which are not shown by the Government statistics. In normal times Germany supplies about 40 per cent of all the wall paper imported, and Belgium, France, and Great Britain furnish the remainder in almost equal proportions. The value of imports from the United States was only $1,704 in 1913. In 1915 they had increased to $14,519, but very little of this increase can be regarded as permanent. Dealers were compelled to buy in the United States because the markets that had formerly supplied them were closed.

Three great difficulties stand in the way of the American exporter of wall paper—(1) the length of the rolls as manufactured at present in the United States; (2) inability to meet the prices of European manufacturers; and (3) the lack of knowledge of styles and market conditions prevailing in Argentina. The first of these is the most important, and until American manufacturers are willing to produce the length of roll that finds general acceptance in the country they can not expect to build up a permanent business of any magnitude. In all the old houses in Argentina the rooms are 4 meters (13 feet 1 inch) square. To meet this condition rolls 8 meters in length have always been imported, and it is very difficult to sell the American roll of 16 yards. It is easy to imagine the inconvenience that is caused a paperhanger when he attempts to paper a 4-meter wall with a 16-yard roll, as he has to make a joining every fourth strip or throw away a part of a roll. The same is true of borders. Two rolls of 8-meter borders are just sufficient for the average room, while a 16-yard roll would lack 4 feet 4 inches of containing sufficient paper, necessitating the purchase of another roll. Conditions in regard to the size of rooms are changing in some respects, and in many of the modern flat and office buildings the walls are generally less than 4 meters, and in such cases paper in the American size is satisfactory. But it is also true that in many of these newer buildings walls are frescoed or painted rather than papered. The question of widths is not so important. European paper is generally 50 centimeters (19.6 inches) wide. In order to meet the requirements of the South American markets English manufacturers, who formerly made paper in 8-yard lengths, are now turning out paper in 8½ and 9 meter lengths. If American manufacturers decide to change their urements it is strongly recommended that they adopt the metric system and make the rolls either 8 meters or 16 meters long.

Price has a very important bearing, especially in the cheaper grades. Before the war American manufacturers were unable to produce paper that could be sold as cheaply as that from Germany, France, or Belgium. It is estimated that, of the paper imported in 1913, 60 per cent consisted of paper costing less than $0.04 per roll at the factory, 20 per cent of paper costing from $0.04 to $0.12 per roll, and 20 per cent of the more expensive grades. Samples Nos. 36 and 37 show some of the cheaper qualities that have the largest sale. The prices ranged from 13 to 17 centimes ($0.026 to $0.034) per roll before the war, and are now about 40 per cent higher. These grades of paper are the principal ones that the wholesalers in Buenos Aires sell to the small dealers in the interior. Assortments of six designs and colors are selected by the wholesaler, and these are packed in bales at the factory, a bale usually containing 60 rolls of each design, or a total of 360 rolls. Before the present high freight rates were in effect the wholesale price was exactly the same in Argentine silver centavos as the factory price in French centimes. Paper that cost 15 centimes ($0.03) a roll at the factory was sold for 15 centavos ($0.064) a roll in Buenos Aires.

In these cheaper grades there is some complaint on the part of local dealers as to the quality of the paper that is used by American manufacturers. It is claimed that the paper is much heavier than that used in Europe and, in consequence, duties are higher on paper coming from the United States than on that from competing countries. Duties are assessed on the basis of weight and paper should be as light as possible in order to be entered with small expense. It is also claimed that American paper contains too much wood pulp, but this is a complaint that is made against all of the European papers as well.

In paper that costs the dealer more than $0.04 per roll American manufacturers are able to compete, although English paper is regarded as equally good and somewhat lower in price. Before the war English paper was about 20 per cent cheaper than similar grades from the United States. Dealers state that they could sell much larger quantities of American paper if the question of lengths could be met. The public seems to be pleased with American designs and colors and the price is not a great handicap, but the paperhanger exerts all of his influence for the use of the 8-meter roll.

Lack of knowledge of conditions in Argentina is a serious bar to the sale of American paper but one that can be removed with time and study. European manufacturers, through their many years' experience in catering to the wants of the country, are familiar with the market and can anticipate the trend of styles. Furthermore, they have representatives, or dealers, with whom they have been doing business for many years, who keep them in close touch with conditions. As a general rule, styles in paper change every two years and the European manufacturers are prepared long in advance for the necessary changes in their designs and color schemes. Four years ago a medium-priced paper that imitated tapestry was quite in vogue. This gave way to paper with very light backgrounds in creams and yellows. Just at present the popular taste runs to darker papers with large figures, such as are shown in samples Nos. 38 and 39. The latter were imported from England, and one dealer states that he has a large number of customers waiting for the arrival of the next shipment of this paper.

There is a demand for paper of the most expensive grades as well as the cheap and medium kinds, and the wealthy classes do not hesitate to pay very high prices for elaborate designs. Several exclusive dealers carry in stock paper similar to that found in the most expensive stores in New York, London, or Paris. Embossed, silvered, and gilded papers and moldings, which in addition to a heavy first cost also entail the payment of a more than proportionately heavy duty, are used to a considerable extent in parlors and reception rooms. Stamped paper that imitates Morocco leather is in demand for libraries and dining rooms.

There are 14 wholesalers in Buenos Aires who import practically all of the paper that is brought in. There are also a few retail dealers who import high-grade paper for their own customers exclusively. Wholesalers sell to small dealers as well as to paperhangers. Dealers in the interior, with few exceptions, buy from Buenos Aires dealers. Many of the wholesalers have been doing business with European manufacturers for many years and it will be difficult to get them to change their accounts. One dealer has had an account with a French firm for more than 30 years, and in 1913 his purchases from that firm amounted to more than 100,000 francs.

As a rule wall paper is sold on the basis of the delivery of documents against an acceptance of a 90 or 120 days' sight draft. In some instances payments are divided, one half falling due 90 days after receipt of merchandise and the balance 90 days after the first payment. Some of the European manufacturers who have relations of long standing with Argentine dealers draw every three or four months for a portion of the money that is due. Prices are quoted per single roll, f. o. b. port of shipment, although in some cases c. i. f. prices are also given. Dealers prefer quotations in francs, since they can readily fix the wholesale price as previously mentioned. Cheap grades of paper are packed in bales covered with burlap, and usually from 300 to 400 rolls come in a bale. The better grades are packed in wooden cases. A charge of 2 francs per 100 kilos (220 pounds) is made for packing in cases, and recently British manufacturers have been making a charge of 2s. for each bale.

Wall paper is used in Argentina for advertising purposes by a large cigarette manufacturer. An offer is made to paper small stores, tobacco shops, bootblacking and barber shops, and other places frequented by men, without charge. The paper, as shown by sample No. 47, has the name of the cigarette placed in the center of each roll at distances of 14 inches along its length. The paper is attractive in design and color. It was formerly made in Germany, but the last order was placed in the United States. The average cost of papering a room, including the cost of the paper, is about $4.50 and the advertisement lasts for several years, without the necessity of renewing.

Wall boards.—Efforts to sell wall boards in Argentina have been disappointing. At times some dealers have carried small stocks, but repeat orders have been very rare. One of the largest dealers in Buenos Aires bought a small shipment several years ago, and it was only during the past year that he was able to dispose of the last of it. Dealers state that the conservatism of the public in regard to the use of this material is so great that they are unwilling to spend the time and money necessary to overcome it.

Fly paper.—In view of the tremendous number of flies that the protracted summers and the long dry spells bring, the consumption of fly paper is small, hardly reaching an average of $5,000 per annum. Practically all of this comes from the United States. Very little effort is made to combat the fly nuisance. Few windows are screened. Restaurants and stores depend upon electric fans to keep the insects away. When the public is awakened to the danger of flies and crusades for their extinction are inaugurated, the consumption of fly paper will probably increase. So far there is little interest in the subject. Advertising by American manufacturers would produce increased sales, but the market so far is so small that the expenditure of the large sums that would be necessary to make an impression upon the people would hardly be justifiable.

Practically all of the fly paper that is sold in Argentina is of the sticky variety. It is carried by department stores, hardware dealers, and druggists. One American manufacturer is represented by an exclusive agent, but the greater part of the paper that is purchased is bought through New York commission merchants.

Cloth-lined paper.—Cloth-lined paper is used for the manufacture of envelopes and sacks used for the shipment of seeds. Very cheap grades of paper are principally used and are imported from Germany and Great Britain. Some American paper has been sold recently, but it is stated that it is much higher in price than that which was formerly brought from abroad.

Blue-print paper.—Blue-print paper is manufactured in the country by two concerns and is also imported from Germany and Great Britain. In normal times the former country supplies about 75 per cent of the imports. There are practically no imports from the United States.

Photographic paper.—American manufacturers are making excellent progress in the sale of photographic paper, and the manner in which they are conducting their business in Argentina gives promise that the lead which they have secured since the beginning of the war will be held after European paper is again on the market.

The value of the photographic paper imported by Argentine dealers and photographers is about $125,000 per annum. For the five-year period from 1908 to 1912, inclusive, 42 per cent came from England, 35 per cent from Germany, and 18 per cent from the United States. In 1913 the Germans obtained the lead and in that year furnished 39 per cent, England supplying 29 per cent and the United States 23 per cent. In the imports credited to Germany there is a considerable amount of Belgian paper that was sold by Hamburg dealers and commission merchants. The average price of German and Belgian paper before the war was 25 per cent lower than that of the American or English, and consumers declared that the paper was equally good. In addition to the lower prices, the Germans were more active in their selling campaigns and were more liberal in their credits than their competitors. Still another factor that had an important effect upon sales was the very complete instructions in Spanish which came with the German paper and the careful conversion of formulas into metric-system weights and measures. American manufacturers were said to be lax in this latter respect, and instances have been pointed out in which their formulas were not correctly converted and, in consequence, photographers using them obtained poor results. There has been a great improvement in both the instructions and the conversions of American manufacturers in the last few years.

In 1913 a prominent Argentine dealer reviewed the situation in regard to photographic paper substantially as follows:

> Up to four or five years ago English paper with a satin finish was used to a large extent. American paper, particularly platino bromide, aristo platino, and various kinds of velox, also found a good market, along with German paper. Within the last three years, however, German factories have made tremendous strides and are at the present time driving rival papers out of the market. The American aristo platino is being practically abandoned because its preparation does not seem to be as careful as formerly. It fails to bring out the deep tones. The German chloro bromide is cheaper and easier to work with than American and English papers and gives excellent results. To give an example of difference in price: We sell similar qualities of German and American paper as follows (retail prices)—Roll of 12 sheets, 19.7 by 23.6 inches, German paper, $3.82; American, $5.01. And we make a larger profit on the German paper. We make less difference in price between German and American paper sold in small quantities, but profits on German paper in this case are still larger. Recently a new Dutch paper similar to the German has been introduced and is doing well. We are visited frequently by German salesmen who offer credit for six months and even longer from arrival of goods.

With the cutting off of supplies from Germany shortly after the beginning of the war, and the diminution of exports from England, sales of American paper largely increased and in 1915 American manufacturers supplied Argentina with 50 per cent of its consumption. In 1916 the imports were valued at $123,000, and of this amount more than 75 per cent came from the United States. In 1917 practically the only paper that was imported was American, but some English paper was still on the market.

The establishment by the Eastman Kodak Co. of a branch house in Buenos Aires, which is operated under the name of Kodak Argentina, Limited, has had an important effect upon the sale of American paper. One of the methods employed by this firm that has been productive of excellent results is the employment of an expert whose entire time is devoted to visiting the photographers with the object of instructing them in the best methods of producing their work, and especially how to secure the best results from the use of American paper and supplies. The Kodak Argentina conducts a wholesale business only and does not sell to photographers.

There are 20 dealers in photographic supplies in Buenos Aires, 5 of whom have branches in other cities of the Republic, and 13 dealers in other places in Argentina. Three of the Buenos Aires dealers (Rossi & Lavarello, Lutz, Ferrando & Co., and Guillermo Koellner) furnish most of the professionals with their supplies and probably import more than 50 per cent of all the photographic paper that is brought into the country. Before the war a number of the dealers had purchasing agents in Europe who bought the greater part of their stocks. There are some 200 professional photographers in Argentina, a fourth of whom have large and attractive studios.

The lack of uniformity in sizes among the professionals compels the dealers to carry in stock a great variety of sizes. About 50 per cent of the paper imported comes in rolls, and the most popular size is 50 by 60 centimeters (19.7 by 23.6 inches). In paper in packages the most desired sizes are 9 by 12, 10 by 14, 13 by 18, 18 by 24, and 24 by 30 centimeters (3.5 by 4.7, 3.9 by 5.5, 5.1 by 7.1, 7.1 by 9.4, and 9.4 by 11.8 inches).

The sales of photographic post cards are increasing in Argentina and are making serious inroads into the sale of paper. While separate statistics have been kept for the past two years showing the amount of the post cards imported, there is a strong probability that the imports of paper and cards have been confused, as both pay the same rates of duty, and that the imports of cards are much larger than shown in the statistics. Practically all the cards now imported are coming from the United States, but before the war Germany was the principal source of supply.

Carbon paper.—The annual consumption of carbon paper amounts to about $100,000, of which about one-half is imported and the remainder manufactured in Buenos Aires. Carbon paper is subject to high duties, which are intended to protect the local factories. Pencil carbon pays $0.21 per pound and typewriter carbon $0.49 per pound. The same rate is assessed on the boxes.

There are two manufacturers in Buenos Aires who make all grades and colors. Their product is a poor quality of grease carbon that smuts easily and can be used only for making a few copies. It is sold principally because it is much cheaper in price than the imported paper. The present wholesale price, which is about 25 per cent above normal, is 2.50 paper pesos ($1.06) per box of 100 sheets, letter size (8¼ by 10¾ inches), and 3 pesos ($1.27) per box of 100 sheets, legal size (8¼ by 14 inches). Prices for pencil carbon per 500 sheets, 16.9 by 21.2 inches, are as follows: Blue and black, thin, $7.22; thick, $7.65; extra, $8.50; red and violet in all weights, $10.63.

In normal years imports are valued at more than $50,000, but there has been a falling off since the beginning of the war. In 1913 they were valued at $53,555, but in 1915 declined to $33,965. Imports come from the United States and Great Britain, principally, but small quantities were also received from Germany and France before the war. In 1913 Great Britain supplied 70 per cent of all the paper brought in, and the greater part of this paper was imported by the English-owned railways. Practically all of the railway companies in Argentina have their principal purchasing offices located in England, and this accounts for the large imports of English paper. Supplies used by the railways are entered without the payment of duties.

American paper is preferred by business firms, and its sale is increasing. It is sold principally by the agencies of a dozen or more American typewriter manufacturers that are located in all the principal cities. Both of the American wholesale paper houses also handle it and sell to stationers and printers. One of these concerns handles the paper that is manufactured by its parent house in the United States, and the other represents two well-known American factories. They import paper in either letter or legal sizes and box it in Buenos Aires, in order to avoid the payment of duty on the boxes at the same rate as paper. One house has its boxes made by local factories, and the other imports its boxes, separate from the paper.

Typewriter dealers who handle carbon paper generally import it in boxes, but as a rule they can obtain higher prices than the ordinary stationer.

Typewriter carbon is sold in boxes of 100 sheets, each 25 sheets being wrapped in oiled paper. A few manufacturers pack each dozen sheets in a separate folder and place either eight or nine folders in a box; when this is done one-half of the folders are printed in English and the other half in Spanish.

Pencil carbon is used by the railways, banks, department stores, etc., and for the manufacture of duplicate sales books. For these purposes paper of domestic manufacture is satisfactory and is sold at a much lower price than the imported.

Roofing paper.—The only roofing paper that is sold in Argentina is American, but the sales are comparatively small. Considerable efforts on the part of American manufacturers to increase their sales have not met with much success, and many years of continuous endeavor will be necessary in order to build up a business of any magnitude. As in other South American countries, galvanized iron is used for all temporary roofing and it is hard to convince the public that roofing paper can successfully replace it. In the cities the flat type of roofing is a bar to the use of ready roofing.

Four manufacturers of American roofing are represented in Buenos Aires by agents who carry stocks. One of these concerns has made a consistent effort for several years to push the sale of its products. An expert roofing man has been kept in Buenos Aires for the purpose of demonstrating the best manner of laying roofs. The greater part of his time, however, has been given up to the building of specification roofs. The same concern has endeavored to increase the sale of ready roofing. Small general stores in the interior have been supplied with samples, advertising matter, and one or two rolls of roofing, but the sales are said to be disappointing. Another Buenos Aires dealer has a small building erected in his store on which various grades of roofing are laid. The exhibit attracts considerable attention and has brought good results.

Roofing dealers depend upon the distribution of samples and advertising matter to produce sales. Samples of the latter are shown in exhibit No. 26. One concern advertises extensively in magazines and farm papers. So far as can be learned, no manufacturer does any direct advertising.

Roofing used in Argentina is imported in rolls containing 216 square feet. A medium thickness has the largest sale. Some dealers get paper packed two rolls to a wooden case, but the greater part comes wrapped in burlap. Cement should be shipped separately, as it is liable to melt on its trip through the tropics and spoil the paper if it is packed in the center of the roll.

Argentine statistics do not show the value of imports. Dealers state that about 5,000 rolls per annum would be the maximum amount that could be sold by any one American manufacturer at present.

Sandpaper.—In normal times American sandpaper is in competition with paper from Germany, Great Britain, and Spain, but American paper is regarded as superior to that from any other country and has the largest sale. In 1913 the imports were valued at $34,632, of which the United States supplied $13,109. At the present time it is the only paper to be found on the market. Some English paper is being offered at prices about 20 per cent below that of the American, and a few orders have been placed recently. The demand in Argentina is for the cheap grades in light weights. The principal sizes are Nos. 00, 0, ½, 1, 1½, 2, 2½, and 3. American paper usually comes 9 by 11 inches and is packed 480 sheets to a ream. German paper is smaller, 8½ by 10½ inches being the size that is principally sold. Reams usually contain 400 or 440 sheets, and for this reason the ream price of the German paper is considerably lower than that of the American. In point of quality it is much inferior; the paper is lighter and flimsy, the grains are uneven, and the glue is poor. English paper is better but, dealers state, is not so good as that manufactured in the United States at the same price.

Sandpaper is imported by eight principal dealers. Four of these have purchasing agents in New York who buy their supplies, and the other four buy from New York commission merchants. In normal times German paper is purchased from Hamburg commission merchants or their Buenos Aires representatives. One American factory is represented in Buenos Aires by a local agent, but the business secured in this way is small on account of the fact that the big dealers buy in New York.

Sandpaper is manufactured in Buenos Aires by one concern whose output is regarded as so poor in quality that it can not compete with the imported article. Another factory is being organized with a capital of $80,000. In the prospectus (Exhibit No. 25) it is stated that the company expects to manufacture 100 reams of paper per day at a cost of $1.22 per ream. Sandpaper pays a duty of about $0.025 per pound.

MARKET FOR PRINTING MACHINERY AND SUPPLIES.

Argentina has been a very poor market for the sale of printing machinery and supplies since 1913, but those who are familiar with business conditions in the country predict a great improvement within the next few years. As previously pointed out, the printing industry was seriously affected by the general depression in financial and commercial circles during 1914 and 1915, and in these years practically no new machinery was purchased. While the year 1916 showed some improvement, the amount of business offered and in sight was not of sufficient proportions to warrant the investment of much money in new equipment. There were more inquiries in 1917, indicating that the printers and publishers were beginning to think about the purchase of additional machinery, but the sales were still far below normal.

The Argentine statistics of machinery imports are based on weights and are, therefore, useless to indicate the real value. It is estimated that in normal times the country purchases annually about $500,000 worth of printing machinery, and the same amount of type, printing ink, and other printers' supplies.

More than 90 per cent of the machinery in use was manufactured in Europe. Germany has been the leading exporting nation for many years. Its manufacturers have supplied the greater part of the book and job presses, cutting, folding, stitching, and ruling machines, and type. France is represented by rotary newspaper presses and book and lithographing presses. England has furnished offset presses and several two-revolution presses of an American design. Italy has supplied a few book and job presses and some type. Imports from the United States have consisted principally of rotary newspaper presses, stone lithographing presses, platen presses, composing machines, cutting machines, and ruling machines.

The large percentage of European machinery may be almost entirely attributed to the strong German and Italian supply houses located in Buenos Aires. Before the war two German houses (Curt Berger & Co. and Hoffmann & Stocker) and one Italian firm (Serra Hermanos) sold more than 90 per cent of all the machinery that was imported. Each of these firms carried very large stocks of cylinder and platen presses, cutting and folding machines, ruling machines, and type, and while at the present time their stock of new machinery is low they have on hand a great quantity of second-hand machinery. More than 30 cylinder presses of various kinds were counted on the erecting floor of one of these concerns. They also have well-equipped machine shops with every facility for the rebuilding of used presses. In addition to their extensive line of German, French, and Italian machinery, they also sold American composing machines, job presses, and type cabinets and stands. There were also four other supply houses operating on a smaller scale.

The facilities that were offered by these firms were responsible for their large sales. Not only were they prepared to deliver a complete printing outfit upon a few hours' notice, but they were willing to grant almost any terms of payment. It was customary to give from 18 months' to 3 years' credit on machinery, and only a small cash payment was required. An instance is quoted of a foreman of a large Buenos Aires printing office who opened his own office a few years ago. He was furnished a completely equipped plant, valued at 30,000 pesos, upon a cash payment of 3,000 pesos, and was further granted a credit of 5 months upon his purchases of paper. While the long terms on machinery appear excessive, the dealers were in reality taking very little risk. If the purchasers failed to make the specified payments, the machinery was taken back, repaired and repainted in the shops, and sold to another printer as new.

The large printers have realized for some years that the long credits were detrimental to their interests. All of them have gone through the experience of having employees leave them and set up competing establishments that were made possible by the easy terms of the supply houses. The new firms, with a small capital investment and little knowledge of the factors that enter into the successful conduct of a printing business, often quoted prices that the older concerns were unable to meet. The latter, therefore, have welcomed the establishment of American houses whose business is conducted on a more conservative basis and who require a cash payment of at least one-third of the value of machinery purchased on time payments.

The ownership of important printing plants by native Europeans and the training of workmen by master printers from those countries had a less pronounced, but nevertheless an important, effect upon sales. The general impression prevailed up to a few years ago that European machinery was not only cheaper but better than American. The introduction of a number of American machines in recent years has removed this prejudice. Printers have found by experience that while the first cost of American machinery may be higher it produces more and better work and has a longer life than machinery from any other country. Furthermore, the standardization of parts simplifies the question of repairs.

The European war will also have an important effect upon the future sales of printing machinery. In many plants the name plates on all German machines have been removed. In others the owners apologized to the writer for the number of German machines that were found. Many years will elapse before this feeling is removed.

American manufacturers of printing machinery are now represented in Argentina in a manner which it is believed will be productive of important results. There are two large supply houses. One of these is a branch of an American firm and has been established in Buenos Aires for 12 years. It also maintains a branch in Rosario. Up to the beginning of the war its principal business was in printing ink, but in the last three years it has added paper and machinery departments. In the showroom are installed a two-revolution cylinder press, an offset press, a cutting machine, and other smaller machinery. An ink and roller-casting factory is also maintained. The other company represents about 30 manufacturers of American machinery and supplies. It has a very handsome showroom in which is installed an exhibit of all the machines sold. Among those shown in operation are three 2-revolution cylinders, an automatic press, cutting machines (from a bench cutter to a 50-inch automatic), platen presses of all sizes, and stitching machines. Each machine is belted up to an individual motor, and a practical demonstration can be given of every machine on the floor. A large supply of type is carried in stock, and the company has its own factory for the grinding and manipulation of printing inks.

Perfecting newspaper presses.—There are 46 perfecting newspaper presses in operation in Argentina. Of these 22 are French (Marinoni), 14 American (8 Hoe, 2 Goss, and 4 Duplex flat beds), 6 German (3 Augsburg, 2 Albert, and 1 Koenig & Bauer), 2 Swiss (Duplex flat beds), 1 English (Payne & Sons flat bed), and 1 unknown. For many years the French machines were regarded as superior to those manufactured in any other country, but in recent years there has been a tendency to replace them with American machines. The adoption by the principal newspaper of the country (La Prensa) of American presses was an important victory for the manufacturers of this country, and the purchase in 1917 by the second largest paper (La Nación) of an American press to replace one of its French machines gives encouragement to the belief that there will be a better market for American perfecting presses than ever before. There is small likelihood, however, of any large sales being made. Only one new press has been sold in Argentina in the past three years. The present equipment is sufficient to take care of the needs of the dailies for several years to come. There is the possibility of the establishment of new papers requiring perfecting presses, but there are a number of second-hand machines on the market and these would be available for the early days of new ventures. Among the smaller dailies of the interior there are one or two whose size and circulation would place them among the good prospects for the sale of flat-bed perfecting presses.

Magazine presses.—Four or five of the Argentine magazines have circulations sufficiently large to warrant the use of high-speed magazine presses, and all of these are now printed on presses of this character. Three of these are German (Vogtlandische Maschinenfabrik) printing from a roll in colors, two are French (Marinoni) semiperfecting presses, and four are German (Augsburg) double-feed cylinder presses, each of which is equipped with two automatic feeders. These presses have a capacity of from 4,000 printed sheets per hour for the last-mentioned to 16,000 per hour for the first. The quality of the work produced is inferior to that of American magazine presses. One of the largest magazines (Caras y Caretas), whose plant is now equipped with three German magazine presses and a number of cylinders, has been studying the question of installing American machines such as are used for printing a Philadelphia magazine.

Offset presses.—The offset system of printing was introduced in Buenos Aires about eight years ago and has met with considerable favor, as orders for a million or more labels, wrappers, or boxes are not infrequent. There are 12 offset presses in the country, all of which were manufactured in Great Britain by one firm (G. Mann). The cost of a one-color press, 33 by 45 inches, of this make, installed in Buenos Aires, in 1915 was $6,031. American manufacturers of this class of press have been backward in entering Argentina, but now that a machine is in actual operation in the showroom of an American supply house in Buenos Aires it is expected that sales will follow.

There are also eight rotary presses for direct printing from zinc sheets. Four of these are German, two English, one French, and one American.

Book presses.—The cylinder book and job press that is found in the greatest number in Argentina is a German machine made in the Augsburg factory. There are several types of this machine, ranging from a simple drum-cylinder press with two form rollers to a modern two-revolution press with four rollers and a complicated inking arrangement. Prices are from $1,200 for the simpler models, delivered in Buenos Aires, to $3,000 for the more elaborate machines. The lower-priced presses are clumsy in design and slow in operation. They will not produce more than 1,200 printed sheets per hour, and the average is about 800. There are generally two feed boards—one parallel to the press bed and an intermediary board, placed at an angle of 45 degrees between the top board and the grippers. The feeder is compelled to transfer one sheet at a time from the top board to the intermediary. In point of quality the work produced on these machines is no better than that of an ordinary American drum cylinder selling at about the same price. The latter, however, will produce at least 50 per cent more work. The more expensive machines are close imitations of a popular American two-revolution press. They are much lighter in weight and lack many of the features that have gained the American press a well-deserved reputation. Pressmen state that the parts of the German machine wear rapidly and that after a few months' operation they are useless for color work requiring an exact register. In one office where an American press and a German imitation of it were in operation, side by side, the proprietor expressed his regret that he had been led to purchase the German machine, although he had saved $1,000 on the original cost.

Among other cylinders to be found in Argentina are a number of presses manufactured by other German concerns, some French machines, a few Italian presses, and a dozen or more English presses built from the plans of the American press that has been imitated by the Germans. Most of these presses have been in operation for a number of years and have no features that make them especially desirable. Their sale can be attributed to the low prices and splendid selling organizations of the representatives of the manufacturers.

There are 12 American presses in operation in Buenos Aires, all of the two-revolution type and made by two manufacturers. Similar machines sell in the United States at from $2,500 to $3,500 each. Now that both factories have efficient selling organizations in Buenos Aires sales should increase in the future. There is a tendency on the part of large printers and lithographers to substitute the three-color process for lithography. Up to the present time there has been no demand for American presses of the drum-cylinder type, and their sale is not being pushed.

The sizes of cylinders most generally in use will take a sheet 32.2 by 46.3 inches in size. Pony presses, taking a sheet half this size, are also in demand.

Platen presses.—The best proof of the superiority of the American platen press for job work is shown by the fact that more than 125 machines of an American manufacturer have been sold by the European supply houses of Buenos Aires in recent years. As a rule these presses were higher in price than a German machine of the same size, but their durability, ease of operation, speed, and the quality of work produced outweighed the additional cost. Sales in the future should be larger now that the manufacturers are represented by an American concern with adequate resources.

There are some 1,200 platen presses in the country. With the exception of the American, a few Italian presses, and some antiquated French machines, they are all German. Many different types of the latter are to be found. Some are very similar to the American Gordon press, while others are heavy machines for embossing and halftone printing, similar to the Gally press. A press of the latter type is also manufactured by an Italian firm. Its most popular size, 13 by 19 inches, sells for $500 and has many good points.

There is no standardization of job presses by the Buenos Aires printers, and in consequence valuable time is lost in waiting for runs on certain presses to be concluded before other forms can be locked up. In one office each of its eight platens are of a different size and manufacture, and forms must be locked up in the composing room for a specified press.

The use of automatic jobbers is limited, considering the number of long runs. The large printers claim to have found it more economical to reproduce small forms and run them on cylinder or offset presses rather than print them, one or two at a time, on automatics. In connection with the use of automatics for printing letterheads it should be borne in mind that letterheads in Argentina are 9 by 11.4 inches in size, and therefore American presses manufactured to print the size used in the United States, 8½ by 11 inches or multiples of this size, can not be used. There are three English automatic envelope-printing presses in Buenos Aires.

Die-stamping presses.—There should be an increased sale in Argentina for American automatic die-stamping presses. The use of embossed stationery is growing in favor, and several English presses for manufacturing it have been purchased within the last several years. At least two firms are now considering the purchase of American machines. One of these has a contract for 10,000 steel-engraved cigarette wrappers, 5 by 7 inches in size, per day. At present the firm is using 20 hand presses, each requiring a pressman and an assistant.

Lithographing presses.—The use of presses for printing from stone is decreasing, their place being taken by offset presses and two-revolution presses for three-color work. The market for the old-style lithographing press will be much less in the future. The greater number of presses now in use are either French or German, although the plant of the largest firm of lithographers in the country is equipped with American machines exclusively.

Cutting machines.—As in all other countries of South America, a German cutting machine (Krause) has the largest sale, and one or more is found in the equipment of every printing office in Argentina. There are a number of types of machines made by the same company, ranging from a 24-inch, handwheel drive, selling at $150, to a 50-inch, fully automatic machine, selling at $2,000. The more expensive machines have many of the features that have made American cutters superior to any others manufactured in the world, but the cheaper machines can not compare with the low-priced American machines in anything except price. For instance, they have no side gauge or interlocking clamp. They are clumsy and take up a great deal of floor space, and the changing of knives is difficult. In price they are about 25 per cent cheaper than the American machine of the same size. The advantage of using the higher-priced American machines of the larger sizes has been demonstrated by the largest firm of printers and lithographers in Argentina. After many years of experimenting this company is now replacing all its German machines with American. Eight of the latter have been installed and two more have been ordered. There are three continuous book-trimming machines in Buenos Aires, all of German manufacture, which are claimed to give satisfaction.

Stitching machines.—In stitching machines the Germans are far in the lead. Practically every large office in the country is equipped with one or more German (Brehmer) stitching machines, and there are not a dozen machines of other makes to be found. Most of the machines have single heads, but machines with two, and even three, heads are not uncommon. The price is about one-half that of an American machine of like capacity. A power machine that will stitch up to one-half inch can be bought for $125, and a double-headed machine, capable of stitching books up to an inch and a half, costs $300. The German machines are equipped with spools upon which the reels of wire can be slipped.

The same firm that manufactures the popular stapling machine also makes a book-sewing machine which is in general use. Signatures of books are stitched with wire to strips of cloth and the latter are pasted to pieces of heavy cardboard forming the covers.

Practically all of the cheap blank books manufactured in Argentina are sewn in this way.

Ruling machines.—All the ruling machines that have been purchased in recent years have been German (Förste & Tromm) disk ruling machines, and the only pen rulers to be found are in some of the older offices and in those that make a specialty of fine work. There seems to be no doubt on the part of the large printers and binders that the disk rulers are faster than the pen machines and that the quality of work produced, especially for blank books, is equally good. There is no sale for pens, as these are made by the individual rulers.

Folding machines.—The same German firm that manufactures the wire-stitching machines in general use in Argentina also makes folding machines that practically monopolized the market before the war. There are not half a dozen machines of other makes in the country. American machines are almost unknown, and there has been little opportunity for a comparison of their work with that of their competitors. In general, it may be said that the German machines are much lower in price than the American and seem to give satisfaction. They are fast, and the quality of work produced is excellent. In one plant eight German folders were noticed that were averaging about 3,000 folded sheets per hour. There should be an increased sale of folding machines in Argentina. Hand labor is expensive, and the customs of the country make it difficult to obtain competent female help.

Automatic feeders.—Automatic feeders have come into general use within the past few years. Many of the large plants are now equipped with these machines. The most popular feeder is an American machine, which forms a part of the equipment of nearly all the offset presses. There is a German imitation of the same machine, which sells for a third less, but does not give as satisfactory results. There are also a number of German pneumatic feeders, which are constantly getting out of order. The tendency on the part of the larger printers to introduce labor-saving devices of all kinds should increase the market for automatic feeders.

Small bindery equipment.—Practically all of the small bindery equipment, such as perforators, round-corner machines, numbering machines, gilding presses, etc., came from Europe before the war, but all the sales that have been made in the last three years have been of American manufactures. The sales, however, have been small. Pedal perforators are in general use, and there are only a few rotary power perforators in the country. Manufacturers of blank books use pedal numbering machines, and these are principally of French manufacture. There is an increasing use of American block numbering machines that are locked up in forms along with type, although French and German manufacturers make the same type of machine, which they sell at a lower price. Hand numbering machines are sold by the rubber-stamp dealers and stationers, as well as by the printers' supply houses. There are a number of German die-stamping presses with heating arrangements for stamping book covers and show cards. Two firms in Buenos Aires, which make a specialty of this work, have 18 machines. All of the large binderies are equipped with similar presses Screw presses used in binding books are manufactured in the country, although the greater part of those in use were imported from Germany.

Composing machines.—American slug-casting machines were introduced into Argentina about 15 years ago, and since that time there has been a constantly increasing sale of these machines until at the present time all the large newspapers in the country and many of the small dailies and printing offices are equipped with them. A cheap German machine in which the matrices are strung on wires has had a considerable sale. Another American machine, which has been on the market in the United States for the last four or five years, has recently been introduced in Argentina, but up to the present time the sales have been small. A number of the large printing offices are equipped with an American machine for composing and casting type in separate units. The number of composing machines in operation in Argentina is as follows: Slug-casting machines, American 355, German 45; other American machines, 12. Sales of American machines and parts have been retarded during the past three years because both of the houses in Buenos Aires representing the American manufacturers of slug casting machines are on the British statutory list. Not only has there been difficulty in securing shipments, but there has been a disposition on the part of owners of machines to refrain from buying anything from these firms that was not absolutely necessary. General dissatisfaction is expressed at the methods that they employed before the war. Argentina should be a promising market for the sale of composing machines of both American types. At least 100 machines should be sold in the next two or three years and from 25 to 35 machines per year after that time. In connection with the sale of machines there should be an excellent sale for electric heaters, furnaces, and saws. Gas in Buenos Aires is high in price and poor in quality, and the installation of electric burners would solve the operator's difficulties in keeping metal at a uniform temperature. Modern furnaces for melting metal are almost unknown, and in only one office in the country is there a saw for cutting slugs. Machines for casting slugs and leads should also be sold in small numbers.

Type.—The sale of American type in Argentina presents the same difficulties as are found in other countries where the Didot system is in general use. After many years of effort to enter the market, American manufacturers have come to the conclusion that it is useless to continue the endeavor to sell type cast on the American point system, and at the time of the writing of this report one of the largest foundries in the United States is preparing to make type for the South American market on the Didot system. Its Buenos Aires branch has furnished specifications of the type for which there is the greatest demand, and it is expected that by the end of the present year the new line will be ready for sale. It is confidently expected that the venture will prove successful, as regrets are often expressed by publishers that they are unable to use modern American faces on account of the difference in body from the type with which their composing rooms are equipped. Some have bought American fonts even at the risk of having the two systems mixed. One or two of the smaller plants and some newspaper offices are exclusively equipped with American point-system type, and it is expected that these will change over to the Didot system after American type of that system is on the market.

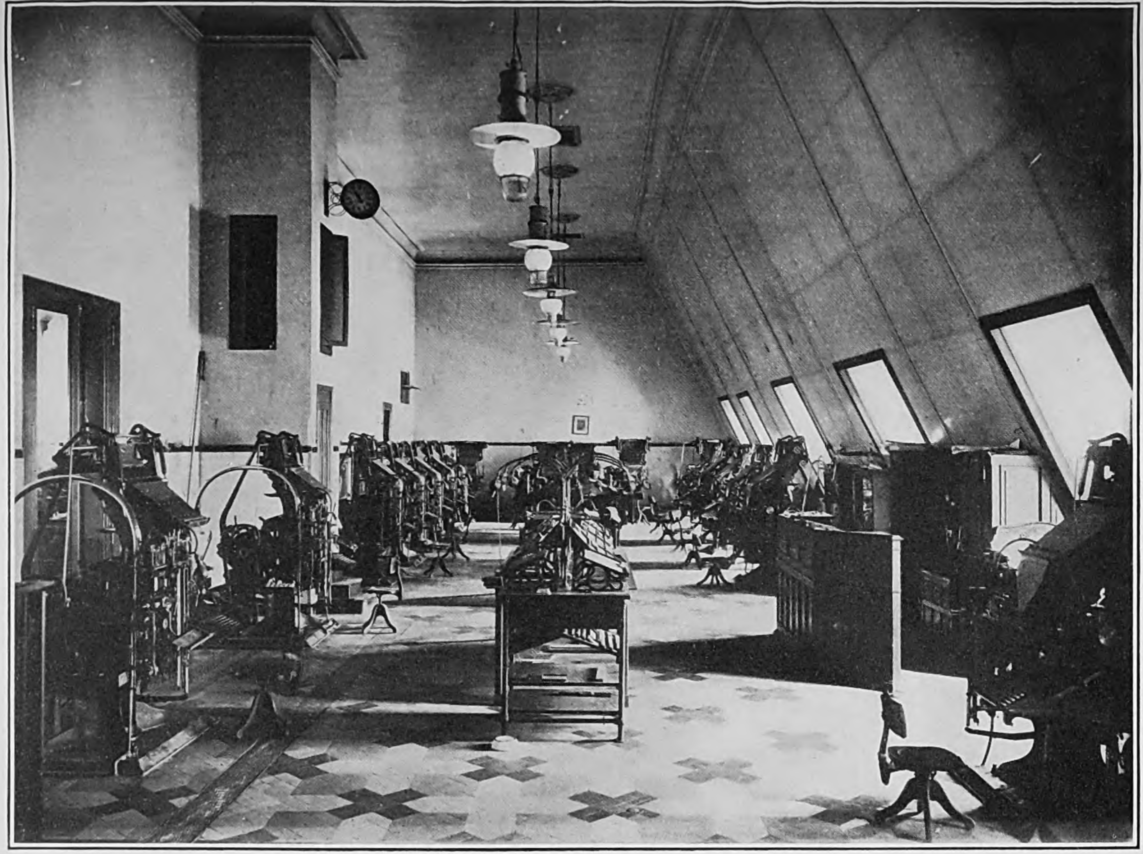

FIG. 8.—LINOTYPE ROOM, LA PRENSA, BUENOS AIRES.

The greater part of the type now in use is German. In 1913 the imports were valued at $68,033, of which nearly one-half came from Germany, a third from Italy, and the remainder from France, Great Britain, and the United States, in the order named. Type is manufactured in the country by one firm, which has seven German type-casting machines. Neither the quantity nor the quality of the product is such as to offer serious competition to imported type.

Composing-room equipment.—The equipment of Argentine composing rooms differs but little from that of printing offices of the same size in the United States. Modern type cabinets, storage stands and banks, iron and stone composing tables, labor-saving fonts of metal furniture, leads, slugs and rules, proof presses, and rule cutters are in general use. In some of the larger offices are to be found electric proof presses and lead casting machines. In the smaller offices, especially in the Provinces, the equipment is more primitive. Ordinary news stands with open cases are used for the storage of type, and wooden tables covered with zinc for the imposing of forms.

All the cabinets, stands, cases, and other goods manufactured of wood come from the United States, and are imported from this country by all the supply houses.

Printing ink.—The importation of printing ink in normal times amounts to more than 800,000 pounds per annum, of which one-half is news ink for the daily and weekly newspapers and the remainder job and lithographic ink. France, Germany, and the United States are the principal countries of origin. France has furnished the greater part of the news ink and the other two countries the finer inks. Since the war practically all the ink has been coming from the United States. There are four firms in Buenos Aires that control the bulk of the ink business. All of these are branches of foreign factories and have plants in Buenos Aires where inks are reground and manipulated to meet the requirements of the local market. The ink that meets with the greatest favor is very slow-drying, differing in this respect from the quick-drying inks used in the United States. It is imported by these firms in barrels and in this way pays a duty of $0.022 per pound gross weight, while ink in cans is assessed $0.07 per pound. The saving in duty more than pays the cost of manipulating and repacking in small containers. Cans are bought from a local factory. Dry colors are also imported to a rather small extent from the home factories. The importation of ink in cans from the United States has not been successful. Not only are the manufacturers unfamiliar with the requirements of the market but the ink seems to go through a chemical change during its trip through the Tropics. One large American supply house, which represents a Boston ink manufacturer, has arrived at the conclusion that the importation of ink in cans is impracticable and in the summer of 1917 established its own factory in Buenos Aires to manipulate ink in the same manner as its competitors.

Binder's cloth.—Only within the last three years has American binder's cloth been sold in Argentina. Previous to that time cloth made in the United States was too good for the market and could not be sold in competition with the cheap English and Continental cloth. One American manufacturer now makes a cloth that meets local requirements both in quality and price. This cloth comes in rolls of 38 yards, 36 inches wide, and costs $0.10 per yard f. o. b. New York.

Higher-grade cloth selling at from $0.15 to $0.25 per yard has a much smaller sale. Binder's cloth pays a duty of $0.026 per pound. Argentina is not a large market for this material. There are not many bound books produced in the country, because local binders and printers can not compete with books printed or bound abroad and admitted free of duty.

Wire for stitching machines.—A cheap grade of wire for stitching machines is manufactured in Buenos Aires, but the better grades are imported from the United States. Galvanized wire is principally used, as practically all the books that are bound in the country are sewn with wire, and a wire that will not rust is essential. Tinned wire is used for magazines and pamphlets. Small quantities of copper wire are imported for expensive blank books. About 80 per cent of the wire imported comes without spools, for use on the German stitching machines, which are equipped with spools. Spools pay the same duty as the wire—$0.03½ per pound.

URUGUAY.

INTRODUCTION: DESCRIPTION OF COUNTRY.

Uruguay is the smallest Republic in point of area in South America, but it is the most densely populated and its people have a larger per capita purchasing power than those of any other country in South America. Its area, 72,210 square miles, is about the same as that of Nebraska, and its population at the end of 1914 was 1,315,714, of which about one-third was in Montevideo, the capital.

Uruguay has been compared to a wedge driven between the Spanish settlements of Argentina and the Portuguese settlements of Brazil, with its base on the Atlantic Ocean. It is separated from Argentina by the Uruguay River and from Brazil by the Santa Ana mountain ranges. The country consists of rolling plains and is fertile and well watered. Agriculture and stock raising are the principal pursuits of its people, and much of its national wealth is derived from flocks and herds. Fifty per cent of its exports consist of animal products.

Montevideo, with a population approaching 400,000, is the only city of importance in the country. It is built on a peninsula running out into the River Plate, near the mouth. Modern and extensive docks have been constructed to accommodate its over-sea commerce. Through this port passes all of the foreign trade of the country. The city is one of the most attractive in South America. Its streets are wide and well paved, and it has many handsome parks, plazas, and public buildings. In Montevideo is centered the manufacturing of Uruguay. While not extensive this is growing, and since the beginning of the war a number of small manufacturing enterprises have been inaugurated and are supplying many articles formerly imported. Large packing houses, which have been built near the city in recent years, provide a ready market for animal products and give employment to several thousand persons. Montevideo is the only port in the country where imports of paper and paper products are entered. It is also a clearing house for a large portion of the trade of the River Plate and a transfer point for much of the freight destined to Paraguay. There is a daily steamer service between Montevideo and Buenos Aires, weekly sailings directly to Asuncion, Paraguay, and all the ocean steamers to and from Buenos Aires touch at its docks. From Montevideo the railways connecting the capital with the cities in the interior radiate, but none of these cities are of sufficient importance to warrant a visit by representatives of American paper and printing machinery concerns. Some travelers, representing several concerns in distinct but allied lines, travel by rail from Montevideo to Sao Paulo, Brazil, in order to visit the important city of Porto Alegre, in southern Brazil, but do not stop en route in the Uruguayan cities.

Uruguay has a larger per capita foreign trade than any other country in South America except Argentina, and its total foreign trade is surpassed only by Argentina, Brazil, and Chile. Its foreign trade has practically doubled within the last decade and in 1915 amounted to $112,059,771, which was a decrease of more than $10,000,000 from the year 1913, when it reached the highest figure in the history of the country. In 1915 the exports amounted to $75,855,845 and the imports to $36,203,926. Previous to the war Great Britain led in the countries supplying Uruguay with its imports. Germany was second, France third, and the United States fourth. For the five-year period from 1906 to 1910 Great Britain supplied 30 per cent, Germany 16 per cent, France 10 per cent, and the United States 9 per cent. In 1915 the United States and Argentina each supplied 21 per cent, Great Britain 20 per cent, and Brazil 14 per cent.

The language of Uruguay is Spanish. The country is on a gold basis, and its peso, divided into 100 centesimos, has a nominal value of $1.034. Since the beginning of the war the value of the peso has steadily risen, and in the summer of 1917 it was worth $1.07. Metric-system weights and measures are exclusively used in the printing and allied trades. C. i. f. quotations, with the measures given in centimeters and the weights in grams per square meter, should always be made if possible.

RECENT ECONOMIC CONDITIONS.

The stability of its currency and the manner in which its merchants have always met their obligations have for many years given Uruguay a high credit among the nations of the world, and this reputation has not been impaired by the trying conditions that have existed since 1914. Uruguay, like other Republics in South America, has been confronted with many difficulties since the beginning of the war, but the serious financial depression noted in other countries, particularly Argentina, has not been so apparent there, and the fourth year of the war finds Uruguay in a stronger commercial and financial condition than obtained prior to its commencement. While the volume of business in lines where imports are necessary continues weak, it is by no means to be inferred that commercial soundness is impaired. On the contrary, the very unfavorable world conditions compelling economy have forced the Uruguayans to acquire habits of moderation and thrift. The easy, long-time credits formerly granted the merchants by their European creditors had accustomed the former to order merchandise freely. Naturally, at the inception of the war they were overstocked and generally over-extended. Having received easy-credit accommodations the merchants were quick to extend equally easy terms to their clients. Commerce, generally speaking, was for that reason heavy and slow-moving, and when Europe began to direct its efforts to warfare instead of supplying the world with manufactured goods, the South American Republics, like all those countries that had placed their main dependence upon Europe for their merchandise, were suddenly confronted by an economic crisis. Uruguay was prompt in adopting measures to remedy its position, and the financial cloud that looked so threatening at the beginning of the war passed over without disturbing conditions to any marked degree. Imports declined because merchants ceased ordering any merchandise except that which was absolutely necessary. The prolongation of the war has had the effect of causing much of the old, unsalable merchandise carried at low valuations to be disposed of at good prices. The consistent increase in both the cost of merchandise and ocean freight rates has also had the effect of causing the merchants to become wary when replenishing their stock. The freight situation began to grow very serious by the fall of 1917, and rates in some instances advanced more than 1,000 per cent.

Financially, Uruguay has prospered by the war because its ranchers and farmers have obtained unprecedented prices for their products, which enabled them to liquidate their accounts with the merchants, the latter in turn paying their foreign creditors. The net result is reflected in the amount loaned by banks, which shows a perceptible decrease, while on the other hand, there is a large increase in deposits and a corresponding increase in cash reserves. Aside from a relatively small number of insignificant failures, Uruguay can be said to be free from bankruptcies. Within the past 25 years only one important firm has failed, and the creditors of that concern were paid 90 cents on the dollar. Credits are generally regarded as being more secure in Uruguay than in any other South American country, and credit information is easier to obtain. Banks and merchants cooperate, and such organizations for the protection of commerce as the Commercial Defense League and the rural societies have their own investigating departments, and complete commercial information is available to their members.

GENERAL FACTORS GOVERNING CONSUMPTION OF PAPER.

The progress that is being made along educational lines and the financial and commercial development of Uruguay are shown in the increased consumption of paper, which has doubled during the past 20 years. Much of this increase must be attributed to the interest that has been taken in educational matters and the reduction of the number of illiterates. The number of schools, teachers, and students has been increased nearly 100 per cent since 1894. In 1913 there were 1,224 public and private schools, with 2,706 teachers and 113,620 students. The increase in the number of persons who can read is shown by the many new newspapers that have been established and the larger circulations of the older papers. The establishment of manufacturing plants and packing houses has caused additional demands for stationery, advertising matter, labels, cardboard, and paper boxes.

The average annual imports of paper and paper products during the five-year period ended 1910 were valued at $759,017. In 1913 they were valued at $1,383,304. The commercial unrest caused by the war and the difficulty in obtaining merchandise from Europe, which had been the chief source of supply, were responsible for the decreased imports in 1915 and 1916. In the latter year, while smaller quantities of paper and paper products were imported, values were even higher than in 1913. Official valuations fixed many years ago, which no longer represent actual market values, are used in compiling Uruguayan statistics, and in consequence there is an undervaluation of at least 50 per cent in the figures for 1916.

Along with the increase in imports during the past decade there has been an increase in the domestic production. The local paper factory has increased its capacity, and in 1915 its output was valued at more than $500,000. Placing the value of the imports at $1,500,000 and the local production at $500,000 gives an annual consumption of $2,000,000, or about $1.50 per capita.

An analysis of the statistics will show that the percentage of manufactured articles of paper as compared with paper destined for printing or manufacturing purposes is much smaller than in other South American countries. This is due to the high tariff on the finished articles and the protection afforded to printers, lithographers, and manufacturing stationers.

STATISTICS OF IMPORTS.

The following table shows the value of the imports of paper and paper products for the years 1911 and 1915, by articles and principal countries of origin:

Articles and principal countries of origin.	1911	1915
Printing paper:		
Argentina	$20,233	$22,971
Austria-Hungary	6,629	....
Belgium	160,586	14,734
Brazil	....	4,148
France	6,327	145
Germany	200,804	17,656
Italy	10,005	24,185
Netherlands	2,378	1,316
Spain	370	8,811
Sweden	....	149,842
United Kingdom	71,209	55,269
United States	77,953	163,088
Total	556,494	462,165
Writing paper:		
Argentina	3,101	510
Belgium	754	....
France	1,189	1,560
Germany	2,920	2,606
Italy	4,569	7,177
Spain	3,698	5,618
United Kingdom	1,826	4,053
United States	832	1,404
Other countries	....	624
Total	18,889	23,552
Wrapping paper:		
Argentina	....	2,115
Belgium	988	857
France	744	579
Germany	....	869
Italy	136	8,387
Netherlands	....	2,888
Spain	30	811
United Kingdom	320	1,994
United States	....	3,626
Total	2,218	20,226
Cigarette paper:		
Belgium	34,132	9,952
France	3,832	19,029
Germany	18,148	....
Netherlands	4,607	7,382
Spain	12,130	22,402
Other countries	750	1,336
Total	73,599	60,101
Sandpaper:		
Belgium	638	....
Germany	223	136
Sandpaper—Continued.		
Spain	$914	$1,170
United Kingdom	1,613	....
United States	3,536	5,039
Other countries	172	795
Total	7,096	7,140
Wall paper:		
Belgium	1,096	77
France	1,515	2,980
Germany	2,485	1,867
Netherlands	....	1,833
United Kingdom	5,814	8,275
United States	735	1,219
Other countries	65	1,251
Total	11,710	17,502
Blotting paper:		
Italy	....	268
Germany	888	507
United Kingdom	3,570	2,234
Other countries	343	....
Total	4,801	3,009
Envelopes and paper:		
Argentina	1,271	1,489
Belgium	7,378	558
France	1,275	1,797
Germany	20,397	2,355
Italy	7,223	3,370
Netherlands	303	3,613
United Kingdom	4,366	4,857
United States	1,568	140
Other countries	222	139
Total	44,003	18,318
Strawboard, pulpboard, coated cardboard:		
Argentina	14,527	33,808
Belgium	5,446	452
France	825	314
Germany	27,412	3,520
Italy	1,261	400
Netherlands	18,530	3,394
Spain	96	1,670
United Kingdom	7,123	2,859
United States	....	3,755
Total	75,220	50,172

Articles and principal countries of origin.	1911	1915
Bristol board:		
Belgium	$3,498	$214
Germany	10,889	1,347
Italy	612	3,610
United Kingdom	3,494	3,496
United States	49	983
Other countries	1,066	758
Total	19,608	10,408
Blank books:		
Argentina	662	512
France	555	....
Italy	1,989	2,752
Germany	4,592	753
Spain	616	137
United Kingdom	2,911	3,715
United States	31	571
Other countries	113	109
Total	11,469	8,549
Printed books bound in boards or cloth:		
Argentina	$24,458	$8,838
France	10,727	7,652
Italy	188	720
Germany	3,759	112
Spain	4,976	4,672
United Kingdom	35,450	6,217
United States	7,510	223
Other countries	21	155
Total	87,089	28,589
Printed books, paper bound:		
Argentina	14,388	6,445
France	8,910	1,546
Italy	892	2,157
Germany	4,572	....
Spain	6,336	6,136
United Kingdom	3,067	4,398
United States	6,007	1,350
Other countries	55	111
Total	44,227	22,143

The following table shows the value of imports by articles for the years 1911, 1913, 1915, and 1916:

Articles.	1911	1913	1915	1916
White printing paper of all kinds in rolls or sheets, larger than 21¼ by 34½ inches	$556,495	$775,822	$462,165	$542,983
Cream printing paper	(*a*)	1,849	(*a*)	70,820
Writing paper, drawing paper, blotting paper, cigarette paper, binders' paper, ruled paper, school composition books	24,324	52,782	26,514	71,158
Colored paper	(*b*)	17,674	(*b*)	6,184
Wrapping paper	2,218	36,894	20,226	20,763
Cigarette paper	73,599	49,334	60,101	40,352
Blotting paper	4,801	(*b*)	3,009	(*b*)
Envelopes:				
Blank	44,003	29,198	18,318	27,892
Printed	(*c*)	2,950	(*c*)	2,177
Papeteries	(*c*)	10,745	(*c*)	11,039
Wall paper	11,710	21,930	17,502	11,680
Sandpaper	7,096	8,000	7,140	5,556
Strawboard, pulpboard, etc	75,220	51,737	50,172	31,717
Coated board	(*d*)	48,925	(*d*)	25,853
Bristol board	19,608	4,383	10,408	17,483
Blank books	11,469	11,433	8,549	7,412
Printed books	131,316	63,069	50,732	34,533
Filter paper	7,132	496	50,666	974
Printed music	1,704	2,508	2,383	4,158
Printed or lithographed matter	7,602	45,158	8,325	8,278
All other classes	44,752	148,417	12,681	32,521
Total	1,023,049	1,383,304	808,891	973,542

a Included in "White printing paper."
b Included in "Writing paper, etc."
c Included in "Envelopes, blank."
d Included in "Strawboard."

In the following table are shown the average imports of paper and paper products supplied by the various countries during the five-year period from 1906 to 1910, inclusive, and the actual values for the years 1911 and 1915:

Countries.	Average, 1906–1910.	1911	1915
Argentina	$61,892	$83,118	$76,068
Austria-Hungary	3,690	7,494	36
Belgium	112,038	220,388	27,381
France	45,596	50,663	93,036
Germany	251,712	317,255	35,238
Italy	42,508	29,388	55,892
Netherlands	23,032	27,007	22,008
Spain	33,802	32,553	54,252
Sweden	....	....	149,842
United Kingdom	78,817	156,462	100,674
United States	105,529	98,467	189,849
Other countries	401	254	4,615
Total	759,017	1,023,049	808,891

As will be seen by the above table, Germany led in exporting paper and paper products to Uruguay previous to the war. The same factors responsible for the large shipments from German ports to Argentina and Chile are equally applicable to Uruguay. Not only did German houses have their representatives and branches in Montevideo, but its proximity to Buenos Aires made it easy for the large German paper jobbers and printers' supply houses, located in the latter city, to send their representatives to Montevideo. A rather surprising feature of the Uruguayan paper trade is the large amount of paper imported from Belgium previous to the war. In 1911 the imports from that country were valued at $220,388, which is particularly large considering the fact that there were no direct representatives of Belgian paper manufacturers in Uruguay, and orders, therefore, had to be placed through commission houses or sent directly to the factories. Imports from the United States previous to the war were practically limited to news print in rolls and printed books.

METHODS OF PURCHASING.

The marked difference between the methods of purchasing in Uruguay and Argentina is that the large consumers of papers in the former country buy directly from the mills or paper export houses, and not from jobbers. Small consumers are supplied by stationers or printers who have a wholesale paper business as a side line. Previous to the war there were no exclusive wholesale paper dealers carrying stocks in Montevideo, but since the war two houses have been established, both of which carry small stocks. One of these is an American firm which also has branches in Argentina and Brazil, and the other is José Iturrat, a Buenos Aires paper manufacturer and dealer. Printing and stationery concerns such as Barreiro & Co., A. Soury & Co., Flores Chance, and Comini Hermanos, carry extensive stocks of paper primarily for their own use, from which, however, they supply smaller printers in normal times. These concerns, as well as a few of the owners of medium-sized printing offices, buy from representatives of mills and paper-exporting houses. There are several of these representatives located in Montevideo, and others come to the city from Buenos Aires at least once a week. The large German wholesale paper dealers in Buenos Aires are making some shipments from their Buenos Aires warehouses, but there has been a large decline in their business since the beginning of the war. Aside from the fact that the German houses are not able to supply merchandise to as great advantage as other concerns, there is a prejudice against dealing with them. The Uruguayan printers, like those in Argentina, have long been under the domination of the German supply houses, and they are realizing that the system of long credits established in the machinery business and the encouraging of new firms to enter the printing field when conditions did not warrant the establishment of such firms have been distinctly injurious factors in the printing and allied trades.

CONDITION OF THE PRINTING INDUSTRY.

Printers in Montevideo have not been compelled to go through a serious financial crisis such as confronted the printers in Buenos Aires when the war produced almost a panic in the latter city. While there was a general slowing down of business in Uruguay shortly after the beginning of the war, it was not at all serious and, in consequence, the printers and publishers were but slightly affected. The large packing houses and many small industrial plants that have been established in or near Montevideo require considerable quantities of printed and lithographed matter, and to take care of this work printers and lithographers have been compelled to increase their facilities. There are no extensive printing plants in Montevideo, and all of them combined would not have as many machines or employ as many operatives as two of the largest Buenos Aires concerns. The most important firm is that of Barreiro & Co., who are printers, lithographers, stationers, and book dealers. They own a large book and stationery store in the center of Montevideo, and also have a modern and well-equipped printing and lithographing plant. Recently a number of American machines have been installed and have given such satisfaction that it is expected that all of the older equipment will be replaced by modern American machines. In their pressroom are installed an offset press, eleven letter-press cylinders, two stone lithographing presses, and twelve platen presses. Linotype machines are used in the composing room, and in the bindery is to be found the equipment necessary for the production of all work in this branch. The second largest plant in Montevideo is owned by the Compañía General de Fósforos, a branch of the Argentine match-manufacturing concern. It is equipped with seven letter-press and lithographing cylinders and makes a specialty of label work. A section of the plant is devoted to the manufacture of playing cards. A. Soury & Co. are wholesale and retail stationers and manufacturers of blank books. They have eight ruling machines, three cylinder presses, and the necessary complement of stitching, cutting, folding, and numbering machines. There are four other commercial plants of almost equal importance. These are Curiel & Co., Enrique Escalante, Peña Hermanos, and José M. Blanco. Each of these has from four to eight cylinder presses, as well as platen presses and cutting, folding, and typesetting machines. In all there are 75 printing establishments in Montevideo, of which 25 may be considered as being of some importance to American paper or printing-machinery concerns. The others are small shops having one cylinder or a few platen presses.

Outside of Montevideo there are no printing offices of any importance. Most of the offices are combined newspaper and printing offices, and their equipment is usually confined to one cylinder press or two or three job presses.

GOVERNMENT PRINTING OFFICE.

The Imprenta Nacional, in Montevideo, has one of the largest and most up-to-date plants in the country. The works are divided into two sections, one for the production of miscellaneous job work and publications for the Government, and the other for the printing of the Diario Oficial, the official daily. The mechanical equipment consists of a Voirin (French) offset press, seven letter-press cylinders, five stone lithographing presses, eight Mergenthalers, and cutting, folding, and binding machinery. The plant employs 165 operatives and consumed $86,000 worth of paper during the year 1916. Purchases are made after the receipt of bids, but since there has been such difficulty in obtaining paper, supplies have been bought in the open market.

PUBLICATIONS OF URUGUAY.

At the end of 1915 Uruguay had 205 stated publications, of which 38 were dailies, 21 semiweeklies, 12 triweeklies, 29 weeklies, 30 semimonthlies, 45 monthlies, and 30 of occasional issue. All of these were published in the Spanish language with the exception of two in French, five in Italian, three in English, and two in Portuguese. Since 1915 there has been a small decrease in the number of publications, and a further reduction is expected on account of the high price and scarcity of paper. In the interior some of the dailies have been changed to triweeklies or weeklies.

Montevideo is naturally the center of the publishing industry of the country. There are now published in that city 16 dailies, 1 semiweekly, 1 triweekly, 3 weeklies, and 55 monthlies or occasional publications. As a rule the newspapers have not been seriously hurt by the war or by the increased cost of paper. Many economies have been effected, the number of pages cut down, and the circulations somewhat reduced. The contraction in the sizes of the papers has made it difficult for advertisers to secure all the space that is desired, and in consequence advertising rates have been increased.

There are four dailies in Montevideo that have circulations in excess of 25,000 copies each, four dailies whose circulations run from 8,000 to 12,000 copies, and four papers whose average circulation is about 4,000. The oldest and best-known of the Montevideo papers is El Día, established in 1885. It has a circulation of 38,000 copies, and its ordinary edition consists of from 6 to 12 pages. Its plant is equipped with two Marinoni perfecting rotary presses and ten Mergenthalers. El Plata, an afternoon daily, and Diario del Plata, a morning paper, are issued from the same plant and are owned by the same company. The former has a circulation of from 25,000 to 27,000 copies and the latter from 10,000 to 12,000 copies. A Marinoni perfecting press, seven Mergenthalers, and a photo-engraving plant comprise the equipment. La Razón, an afternoon daily, with a circulation of from 25,000 to 30,000 copies, El Siglo, a morning daily with a circulation of from 10,000 to 12,000 copies, and El Telégrafo, an afternoon daily with a circulation of from 8,000 to 12,000 copies, are all owned by the same company, and are printed in one plant, which is equipped with three perfecting presses, seven Mergenthalers, and a number of cylinder presses for book and job work. From the same plant is also issued El Diario Español, a morning daily devoted to the Spanish colony, with a circulation of 4,000 copies. Tribuna Popular is one of the best-known of the afternoon papers and is a close rival of El Plata and La Razón for second place in point of circulation. In normal times it also publishes a morning edition, but this has been temporarily discontinued. Its pressroom is equipped with a perfecting press, and in its composing room are eight Mergenthalers and two monotypes. Among the dailies of smaller circulation are La Mañana, El Pueblo, La Democracia, El Bien, La Defensa Comercial, and the Montevideo Times. The last-mentioned is the only English daily published in Uruguay. Among the class publications are three important journals devoted to stock raising and agriculture, two commercial and financial reviews, and medical, scientific, and engineering publications.

There are no weekly or monthly magazines of general circulation, and this is attributed to the fact that the important weekly magazines of Buenos Aires are sold to a considerable extent in Montevideo. One of these publications is said to have a sale there of more than 7,000 copies per week. Efforts to establish a national weekly or monthly magazine have not been successful, and while there are a number of small publications, none of them has a circulation of more than 2,000 or 3,000 copies.

TARIFF ON PAPER AND PAPER PRODUCTS.

The Uruguayan tariff provides for both specific and so-called ad valorem rates of duty on paper and paper products. There are more than 30 different classifications of paper and paper products in the schedule. On more than one-half of these the rates are specific, and on the remainder ad valorem. The latter rates are only nominally ad valorem, because in all instances fixed official valuations instead of actual invoice values are used in computing duties. To both the specific and ad valorem rates, surtaxes (which have been increased since the beginning of the war in order to obtain additional revenue) are added. On articles where the duty is specific official valuations are also provided, as the surtaxes are certain percentages of the official valuations.

In general the tariff is protective and the rates are so high on some grades of paper and paper products manufactured in the country that their importation is practically prohibited. The most striking example of the protective character of the tariff is shown in the case of wrapping paper. The specific rate is 7 centesimos per kilo, to which are added surtaxes of 14 per cent on the official valuation of 16 centesimos per kilo, making the actual duty about 4½ cents per pound. This rate applies on all grades of wrapping paper from the cheapest to the most expensive. In the following table are shown the actual duties collected on a shipment of 1,830 kilos (4,034 pounds) of kraft wrapping paper:

	Uruguayan pesos.
Specific duty, 7 centesimos per kilo	128.10
Surtaxes, 14 per cent of official valuation of 16 centesimos per kilo	40.99
Storage and customhouse handling, 12 centesimos per 100 kilos	2.19
Stamps on transfer	1.50
Lighterage	2.40
Permission to customhouse broker	2.24
Commission	2.40
Total	179.82

The amount above indicated, 179.82 Uruguayan pesos, is equivalent to $186.11 United States currency, or $0.046 per pound.

Duties on news print and white printing paper are quite low. News print in rolls for use by newspapers is valued at 6 centesimos per kilo, and the rate is 12 per cent, making the actual duty less than two-fifths of a cent per pound. News print in sheets and all grades of white printing paper, provided it is not sized and is imported in sheets not smaller than 54 by 87 centimeters (21¼ by 34¼ inches), pays 12 per cent of a valuation of 14 centesimos per kilo, or about 1 cent per pound. In the following table are shown the duties collected on a shipment of 11,812 kilos (26,041 pounds) of white printing paper:

	Uruguayan pesos.
Ad valorem duty of 8 per cent of official valuation of 14 centesimos per kilo	132.29
Surtax, 4 per cent of official valuation	66.15
Storage and customhouse handling, 12 centesimos per 100 kilos	14.17
Lighterage	7.27
Permission to customhouse broker	12.00
Commission	13.50
Total	245.38

The amount above indicated, 245.38 Uruguayan pesos, is equivalent to $253.96, or $0.0097 per pound.

White and drawing paper, blotting paper, cigarette paper in reams, account paper, binders' paper, and school composition books are grouped in one classification. The valuation is 35 centesimos per kilo, and the rate 45 per cent, making the actual duty about 7½ cents per pound.

Printers, lithographers, and manufacturing stationers are protected by high duties on their products. The specific rate on printed, lithographed, or engraved matter ranges from $1 to $3 per kilo, according to the class of work, to which are added surtaxes of 14 per cent on official valuations amounting to $2.50 per kilo for the most important classes. Blank envelopes are valued at 45 centesimos per kilo, and the ad valorem rate is 45 per cent, making the actual duty 9½ cents per pound. On blank books the duty is 45 per cent of 56 centesimos per kilo, or 11.8 cents per pound.

URUGUAY'S ONLY PAPER FACTORY.

The Fábrica Nacional de Papel, the only paper factory in Uruguay, is located at Puerto del Sauce on the River Plate, almost directly opposite the city of La Plata, Argentina, and four and one-half hours by rail from Montevideo. The company was organized in 1892, but the mill was destroyed by fire about five or six years ago and has recently been rebuilt. The company was incorporated in 1913 and has a capital of $840,000. The value of the land, buildings, machinery, and stock on hand is said to be about $500,000.

The high prices and scarcity of imported paper, due to war conditions, have caused a demand for the domestic paper, which has been listed at prices 100 per cent higher than those in effect before the war. Production has been hampered to some extent by the difficulty in obtaining pulp from the Scandinavian countries, which were formerly the chief source of supply.

The mill is equipped with two Fourdrinier paper machines. The largest of these was installed three years ago and makes a sheet 102 inches in width. It was built by the German engineering firm of E. Fueller and is one of the most modern paper machines in South America. It has a capacity of 22 tons of paper per 24 hours. The second machine was made in Germany 15 years ago and makes a finished sheet 74.8 inches in width. During 1916 the mill produced an average of 14 tons of paper per day. About one-half of this consisted of manila and bogus wrapping paper, and the remainder of colored poster cardboard, tissue paper, and blotting paper. News print and white printing paper are produced in small quantities. The factory maintains a retail store in Montevideo and sells directly to printers. Complete samples of all papers made by the mill, together with pictures of the buildings and machines, are included in sample No. 1 (see p. 164).

MARKET FOR PARTICULAR LINES OF PAPER.

News print.—The consumption of news print in Uruguay is about 5,000 metric tons per annum, of which about 3,600 tons consist of news print in rolls for use on perfecting presses by the newspapers of Montevideo, the remainder being in reams. The latter is used by the small daily and weekly newspapers in the interior, and also for miscellaneous job printing. News print is also used for wrapping, and the consumption for this purpose is increasing because it is the cheapest kind of paper to be obtained.

The annual consumption of the 16 daily newspapers of Montevideo is approximately 12,000 rolls, weighing about 300 kilos (660 pounds) each. As all of the large newspapers, with one exception, have Marinoni (French) perfecting presses of the same style, nearly all of the paper consumed is in rolls 35 inches wide.

The consumption of the dailies of Montevideo is approximately as follows: El Día, 1,000 tons; Tribuna Popular, 600 tons; El Plata and Diario del Plata, 850 tons; El Siglo, La Razón, and El Telégrafo, 750 tons; La Mañana, 350 tons; El Bien, La Democracia, El Pueblo, and Uruguay Sport, 300 tons. At the present time all the news print in rolls is being imported from the United States and is being sold by two American concerns.

There is not a wide variation between the prices quoted in Montevideo and in Buenos Aires. Just prior to the war a French concern was supplying two of the Montevideo papers with news print at $1.90 per 100 pounds, c. i. f. Scandinavian port. Prices of American paper were not much higher, and even up to a year ago (this report written in December, 1917) paper was being furnished for $2.65 per 100 pounds, c. i. f. Montevideo. There does not seem to be such a scarcity of news print in Montevideo as was noticed in Buenos Aires. While stocks are somewhat lower than normal, the more important publishers have sufficient paper on hand to last from 9 to 12 months. There seems to be no reason why the large business in roll news print now enjoyed by American manufacturers should not be continued after European paper is again available. The American companies now supplying Uruguay occupy a strong position in the market. They have rendered exceptionally good service despite trying conditions, and the publishers, in general, seem to appreciate their efforts.

The difficulty of securing light weights is the principal drawback to the sale of news print in sheets by American manufacturers. As in Argentina and other countries of South America, there is a demand for paper weighing not more than 45 grams per square meter. European manufacturers have always been willing to supply this weight without extra cost and in consequence have been able to secure the bulk of this business. While small publishers and job printers are now compelled to use paper weighing 52 to 55 grams per square meter, it is probable that they will again turn to Europe for their supplies when lighter weight paper is available. Sizes of news print in sheets that are principally used are 28.3 by 36.2 inches, 27.1 by 39.4 inches, and 31.9 by 46.5 inches.

Printing paper.—Stock used by the printers and lithographers in Uruguay is similar in nearly all respects to that used in Argentina. As in the latter country, printers have long been accustomed to using one grade of paper for all job printing. This paper is a combination printing and writing paper, which was formerly imported from Germany and Belgium and which is also made by the Argentine mills. In its manufacture bleached sulphite and white rags are the principal ingredients. It is sufficiently sized to be written upon with pen and ink. Before the war a good grade of this paper could be purchased in Germany for less than 4 cents per pound, and there is no doubt that after the war, if it can be obtained at a price anywhere near the former one, it will be more largely used in Uruguay than any other paper. In the place of this combination paper, which is practically unknown in the United States, printers have been buying almost any paper that they could secure. Machine-finished and supercalendered book papers are being used for magazines, books, and miscellaneous job printing, and cheap sulphite bonds and flat writings for forms, blanks, and similar work where the consumer is required to use pen and ink. The large orders that have been given the local printers by the packing houses for labels to be used on their products has created a demand for paper coated on one side and suitable for lithographic or color work. It should be borne in mind that in shipping printing paper of all kinds into Uruguay the sizes should never be less than 21¼ by 34¼ inches, as paper of smaller sizes is assessed as writing paper. Printing paper is imported in three principal sizes, 27½ by 39½ inches, 28½ by 36¼ inches, and 32 by 46½ inches. Weights run from 25 kilos to 70 kilos per ream of 500 sheets. As in the case of news print, there is a demand for lighter weights than have heretofore been supplied by American manufacturers without an extra charge.

Writing paper.—Combined writing and printing paper, flat writings, sulphite bonds, and ledger paper are principally used for writing purposes. These are imported in flat sheets and made up in tablets, packets, and papeteries by local manufacturers (these being sold by stationers, druggists, and dealers in general merchandise) or printed or lithographed for general commercial purposes. For the latter cheap sulphite bonds are now largely used and have replaced to some extent the combined writing and printing paper formerly imported from Germany and Belgium. Business men have found that the cheap American bonds are better suited for ordinary correspondence written on the typewriter than any other paper that they can buy at anywhere near the same price, and in consequence imports of this grade of paper have steadily increased. The size for which there is the greatest demand is 22.8 by 36.2 inches, from which 8 letterheads, 9 by 11.4 inches, can be cut. There is a much smaller demand for the next popular size, 28.3 by 36.2, which is principally used for cutting paper used for legal purposes, viz, 9 by 14.1 inches. Colors are used to a very small extent, practically all of the orders specifying white paper. Paper without watermark is preferred, because in many instances cheap white bonds without watermark in the large sizes are passed through the customhouse as printing paper. The question of weights has been a serious one for dealers in American paper. The greatest demand is for light weights, paper of a 13-pound basis (17 by 22 inches weighing 13 pounds to a ream of 500 sheets) having the largest sale. American manufacturers have always made an extra charge for paper of this weight, while European manufacturers have sold it at the same price per pound as the heavier weights. Sulphite bonds are also used for the manufacture of tablets, packets, and papeteries. Tablets are manufactured in letter and note sizes and usually contain 100 sheets each. Ordinary or coated blotting paper, printed with the advertisement of the dealer, is used for the covers, and is attached to the top of the pad with binder's cloth. Pads are made with either ruled or unruled paper, and in the case of the former there is marginal as well as cross ruling. In this connection one large stationer stated that he could not sell ruled pads manufactured in the United States because the cross rules went all across the sheet instead of stopping at the marginal line. Ruled paper in packages is sold by the small dealers in the interior. These packages usually contain from 300 to 400 sheets, 5¾ by 9 inches, and weigh about 1 pound each.

For deposit slips, bills of lading, invoices, and forms upon which writing is to be done with pen and ink the demand is for printing paper, sufficiently sized to take ink without blotting or showing through on the reverse of the printed side. The combined writing and printing paper that was formerly imported from Germany and Belgium, and that is still being manufactured in Argentina, fills this requirement admirably. In its place American flat writings are being substituted, but these are too expensive for ordinary job work.

The better classes of retail stationery and department stores in Montevideo carry good assortments of papeteries. Before the war these were purchased in Germany, Belgium, France, and Great Britain. Imports from the United States have increased in the last three years and have largely supplanted the European goods. Dealers state that the assortments are not as good and that prices are somewhat higher than they have been accustomed to pay, but, in general, they are pleased with the goods that they are receiving from the

United States. The market for imported papeteries is limited to goods costing from 25 to 50 cents per box. Cheap papeteries, selling for 10 to 15 cents per box, can not be imported because of the local competition. Several manufacturers are putting out boxes, containing 25 sheets of paper and 25 envelopes, which retail at 25 cents each but which do not cost more than 13 cents to manufacture. There is a small demand for boxes of cards and envelopes for social correspondence. These come in many different sizes and shapes. In considering the question of the sale of boxed stationery in Uruguay it should be borne in mind that Montevideo is one of the most progressive of the South American capitals. There is a small but select circle of wealthy Uruguayans, diplomats, Government officials, and foreign residents who use the highest grades of stationery for their correspondence and to whom paper used in similar circles in the United States and Europe naturally appeals.

Official stamped paper, which must be used for all legal documents such as deeds, leases, powers of attorney, petitions, authorizations, etc., is sold by the Government. This is purchased directly from the mills. For many years the Government has had a contract with a Spanish mill for handmade paper, as shown by sample No. 2 (see p. 164). The annual consumption is 2,000 reams of 500 sheets, 12½ by 17¼ inches. In the center of each sheet is watermarked the coat of arms of Uruguay. The paper is ruled at the mill and is afterwards stamped and numbered by the Government, which has automatic presses for this purpose in the Internal Revenue Department.

Wrapping paper.—The importation of cheap wrapping paper is practically prohibited by the duty of about 4⅓ cents per pound. Better grades are imported to a small extent, but the conditions surrounding their importation are such as to make the market very uncertain for American manufacturers. All grades of wrapping paper, from bogus to genuine kraft, are manufactured by the Fábrica Nacional de Papel, whose plant is equipped to produce all the wrapping paper that is consumed in the country. Its prices, however, are not based on manufacturing costs, but rather on the laid-down cost of imported paper. At times these prices are really higher than those of the foreign-made paper, but are quickly reduced in case of any large importations. The greater part of the wrapping paper used in Uruguay consists of bogus wrapping, made from waste paper, straw, colored rags, and a small percentage of imported wood pulp. It is cut into sheets, 14 by 18 inches, folded once, gathered into hands of 5 sheets, and packed in bales containing from 12 to 30 pounds. The price has greatly increased since 1913 and is constantly fluctuating. In 1913 it was sold for 6½ cents per pound. During 1916 the price ranged from 8 to 12 cents per pound. The same paper is made into sacks, similar to the sacks made from "papel de estraza" by the Argentine mills. Both paper and sacks are sold directly to merchants by the mill and are also handled by several large wholesale grocery and produce merchants of Montevideo. The latter supply the small merchants in the interior. Another popular grade of wrapping made by the local mill is specimen 80 shown in sample No. 1 (see p. 164). This is a cheap white paper, made principally of ground wood. It is cut in sheets, 11 by 16 inches, and packed in bales containing 1,850 sheets and weighing 22½ pounds. The selling price in 1913 was 9 cents per pound and in 1916 12 cents per pound.

It is apparent that paper in these grades can not be imported to compete in price with the domestic paper, as in many instances the selling price of the latter is less than the duties and freight on the imported. The only factor that keeps the prices of the domestic paper down to the figures at which it is sold is the competition of news print, which is increasing in use for wrapping purposes. Regular sizes as used by newspapers and printing offices are purchased by retail dealers and cut by the latter into small squares, which are afterwards folded into cones to contain such articles as coffee, tea, rice, sugar, etc. Many of the small retail dry-goods stores use news print exclusively for wrapping the goods sold. Bakers, druggists, and confectioners are also large consumers of news print.

Imitation kraft, manila, and heavy packing papers are manufactured by the local mill in various sizes and weights. In the heavy papers the sizes generally used are 27½ by 31½ inches, 41¾ by 55 inches, and 43⅓ by 55 inches. They are usually sold in 10-kilo (22⅕-pound) packages, which contain from 30 to 180 sheets. Manila and colored fiber in light weights are supplied in rolls, 10, 20, and 30 inches wide. For these rolls patent holders and cutters are provided. The use of paper printed with the advertisement of dealers in unknown.

Grease-proof, parchment, and glassine paper are included in the statistics as wrapping paper and make up the greater part of the imports of about $25,000 per annum. Small quantities of inferior grease-proof paper are made by the local mill, but the competition offered to imported paper is negligible. Parchment and glassine paper came from Germany and the Scandinavian countries before the war but are now coming from the United States. There was some Scandinavian glassine paper on the market in 1916, but by the summer of 1917 the supply was exhausted. While the price of American glassine has been lowered in the past year, that of the Scandinavian has been increased. In the summer of 1917 bleached glassine made in the United States was being offered at 16 cents per pound and the Scandinavian product at 24 cents. Both of these prices were f. o. b. point of embarkation.

Cardboard.—The consumption of cardboard is increasing. Many small articles, especially in medical and toilet goods, that were formerly imported from abroad are now manufactured in the country, and cartons, printed or lithographed by local concerns, are needed for their packing. Show cards and hangers are also used to advertise these goods. Lithographed calendar backs, which were formerly imported from Europe, can no longer be obtained, and in their place merchants are using plain backs, which are printed in Montevideo. The expansion of the packing-house business in Uruguay has created an additional demand for many grades of cardboard. For printing and lithographing purposes white folding bristol, coated board, and mill board are principally used. American manufacturers are now furnishing all these goods. Before the war they were unable to meet the competition of German, Austrian, and Belgian mills. Prices were from 25 to 50 per cent lower in those countries than in the United States. Strawboard and pulpboard are used for the manufacture of paper boxes and the binding of books. The Netherlands has been the principal market for the former, and the Scandinavian countries for the latter. American manufacturers have been supplying both classes recently, but prices are double and often three times those that were formerly paid. Owing to the high prices of imported strawboard and pulpboard, local box makers are using larger quantities of gray bogus board, which is made by the Fábrica Nacional de Papel. Another small mill in Montevideo also produces a very cheap board made of old newspapers and waste materials of all kinds. The Fábrica Nacional de Papel also makes a line of colored boards, as shown by specimens 48 to 54, inclusive, in sample No. 1 (see p. 164).

Toilet paper.—The sales of toilet paper are confined to Montevideo, and while they are small they are increasing. There has, however, been a small decrease in the past two years on account of the high freight rates. The demand is about equally divided between roll and packet paper. American paper is well established on the market, and there is no reason why it should not be sold in greater quantities than that from any other country, as it is considered equal in quality and as low in price as paper that was formerly imported from Germany and Great Britain. Toilet paper is sold by drug, hardware, and department stores. Stocks are purchased through commission merchants, either from their Montevideo representatives or directly from their New York or European offices.

Cigarette paper.—There is but little opportunity for the sale of American cigarette paper in Uruguay, as, under ordinary conditions, the market is supplied by paper makers in France and Spain, from whom cigarette manufacturers in the United States buy a large part of the paper that they use. Paper is imported in bobbins for use on automatic machines, in sheets to be cut up into books for smokers to roll their own cigarettes, and in books manufactured in Franco. There are four dealers in cigarette paper in Montevideo, all of whom represent European mills.

Cover paper.—For covering magazines and pamphlets white coated or colored supercalendered paper is used, and there is no demand for American fancy cover paper. A few reams are stocked by some of the largest dealers, and efforts have been made to promote its more extended use, but the printers and publishers are conservative in this respect and little progress has been made.

Blotting paper.—The consumption of blotting paper is small, but it is increasing. American paper is acknowledged to be as satisfactory as the European product and is sold at a competitive price. The sizes and weights do not differ from those used in the United States except that the market is larger for light-weight and cheap paper.

MARKET FOR MANUFACTURES OF PAPER.

Envelopes.—Large baronial envelopes, made of thin colored paper, lithographed or printed on the inside, are used in Uruguay for commercial correspondence. Previous to the war some were imported from Europe despite the high duty of 9½ cents per pound, but recently envelope machines have been installed in Montevideo that are capable of producing all the envelopes consumed in Uruguay. One of these machines is a Schmidt (American), with a capacity of 50,000 envelopes per day. Present prices of domestic envelopes are based on the cost of the paper plus a manufacturing cost of 50 centesimos per 1,000. German-made envelopes were obtainable in Montevideo before the war at 80 cents per 1,000, including the duty of about 40 cents per 1,000, and if as low prices are made by the German manufacturers after peace is restored the local manufacturers will be compelled to reduce their prices in order to compete. Small quantities of fancy envelopes for social correspondence, and linen, bond, and cloth-lined envelopes used by Government and financial institutions are also imported. Efforts have been made by dealers in American paper to introduce oblong commercial envelopes such as are commonly used in the United States, and while some sales have been made because of the difficulty in obtaining baronials no permanent impression has been made upon the market.

Printed books.—In 1911 the value of all printed books imported into Uruguay was $131,316, of which Argentina supplied $38,846, Great Britain $38,517, and the United States $13.517. In 1915, when all Uruguayan imports were greatly diminished, the value of the imports was $50,732, of which Argentina supplied $14,983, the United Kingdom $11,615, France $9,198, and the United States $1,573. The greater part of these imports consisted of works of fiction. The preponderance of imports from Great Britain over those from the United States in 1911 was due to the large English colony in Uruguay, which had a preference for the works of English authors.

There are two bookstores in Montevideo that make a specialty of books in English and British and American magazines. Many of the large bookstores carry a few volumes of scientific works, textbooks, dictionaries, and language methods. There is considerable demand for the last named, as the number of persons who are studying English is increasing.

The market for schoolbooks by foreign authors is small and is confined to private schools and institutions of higher learning. The text books by Uruguayan authors are used in the lower grades of the public schools. These books are approved by the Inspección Nacional de Instrucción Primaria, a national council that has supreme jurisdiction over primary instruction, but each teacher is permitted to select from the approved list the books to be used by the pupils. Some 400 separate books are on the approved list, but only a few of these have any extensive use. Among the latter are 15 books, of which 70,000 copies are purchased annually. The greatest demand is for readers, and two series have the largest sale. The Figueira series, prepared by Dr. José H. Figueira, consists of five books, corresponding to the First, Second, Third, Fourth, and Fifth Readers used in the United States. The books are well illustrated and are bound in boards. The First Reader is called "Quieres Leer?" ("Do You Want to Read?"), the Second "Adelante!" ("Forward!"), the Third "Un Buen Amigo" ("A Good Friend"), the Fourth "Trabajo" ("Labor"), and the Fifth "Vida" ("Life"). The annual requirements for the five books amount to about 50,000 copies.

Previous to the war the books were printed in Germany and editions ranged from 100,000 copies of the First Reader to 10,000 copies of the Fifth Reader. The printing of new editions of all five books is now being considered, and an opportunity has been given American printers and publishers to estimate on their production. Similar series of readers prepared by Dr. Figueira are in use in Paraguay and Argentina. Another popular series of readers consists of six books prepared by Sra. Emá Catala de Principalle, which have an annual sale of from 2,000 to 4,000 copies each. These books have heretofore been printed in Montevideo.

In the normal schools, universities, and private schools a large number of different books are in use, but the quantity of any particular book is small. They are, as a rule, printed in Montevideo, and editions of more than 1,000 copies are rare. Small quantities of medical, scientific, and law books are imported from the United States, Great Britain, Argentina, and European countries.

Blank books and letter-copying books.—The high duty of about 12 cents per pound on blank books and letter-copying books practically prohibits their importation, and consumers are compelled to buy books made in Uruguay. All the large stationers have their own plants and make the books that they sell at retail. Three large concerns are engaged in the manufacture of commercial books that are sold to small stationers. Nearly all the important printers make special ruled books to order. All grades of blank books are manufactured in Montevideo, from paper-bound memorandums to the highest-grade ledgers and cash books. Some of the firms have been engaged in business for a score or more years, and their product compares favorably, in price and quality, with books manufactured in other countries. Among the sizes having the largest sale are super-royal, royal, medium, demi, foolscap, pot, and corona. Books of the last-named size, bound in black cloth, are sold to a greater extent than any other, and are principally used by small merchants. The Uruguayan Government requires all commerical establishments to have three of their principal books—viz, ledger, cash book, and inventory—stamped. No charge is made for this service,. but heavy fines are imposed on any firm that does not have these books authorized by the Government. This Government regulation prevents the use of loose-leaf books except as auxiliary books. Some of the large firms, expecially those in which foreign capital is invested, keep their principal accounts in the stamped books but all of their small accounts in loose-leaf books.

Practically all of the imports of blank books consist of pocket memorandum books, which are generally used by farmers and stockmen in the interior and business men in the principal cities. The greatest demand is naturally for an inexpensive book, and the use of memorandum books distributed as advertisements is not uncommon. Loose-leaf ring memorandum books have been on the market for some years and their use is increasing. They were formerly imported from Germany and England, but since the introduction of American books the latter have had the largest sale. There would seem to be opportunity in Uruguay for the sale of larger quantities of loose-leaf books than are bought at present. Their small use is not to be attributed to any prejudice against them, but rather to lack of familiarity with their advantages.

Letter-copying books are manufactured by the same firms that produce other blank books. Foreign-made books can not be imported to compete with the domestic product, on account of the high duty. Previous to the war small quantities of very cheap books were imported from Italy and Germany, but the supply has been exhausted. Some of the large British banks and commercial establishments import books from England for their own use. The Uruguayan law requires the copying of all letters in a bound book, which must be stamped by the Government.

Printed, lithographed, and engraved work.—The high duties on printed, lithographed, and engraved work practically prohibit its importation. The exceptions are calendars, gravures, and art works, which are not produced in the country. The printing industry in Montevideo has been developed to such an extent that all ordinary commercial printing can be produced at prices that compare very favorably with those of foreign printers. This fact is shown by the large orders for labels and advertising matter placed recently with local printers by the foreign-owned packing houses. Highly lithographed hangers, folders, and cut-outs were extensively used for advertising purposes before the war. These came from Germany, and since the cutting off of supplies from that market their use has been almost entirely discontinued. Prices quoted by American manufacturers were sometimes double and often three times those that had been paid for similar goods in Germany. Local concerns now use calendars with ordinary printed backgrounds for advertising purposes. British and German manufacturers have alternated in obtaining the orders from the Uruguayan Government for the printing of bank notes. Those now in use are similar in design and texture to bank notes in circulation in the United States, but the quality of the engraving is much inferior. There should be an opportunity for American bank-note concerns to bid on the future requirements of the Government. Recently some bank notes, bonds, and other national obligations have been engraved at the Argentine mint in Buenos Aires.

Playing cards.—Statistics of the imports of playing cards fail to show the consumption of imported cards because of the large amount of smuggling that results from the duty of $11.50 per gross. In 1915, according to the statistics, only 706 gross were imported. Of this quantity, 386 gross came from France, 227 gross from Spain, and 93 gross from the United States. The Government is aware of the extent to which smuggling in playing cards is indulged in, and is considering the reduction of the duties and the imposing of internal-revenue taxes. Under this plan each pack of playing cards sold in the country would have to bear a revenue stamp. It is proposed to tax the imported cards 15 or 20 cents per pack and the domestic cards 10 cents per pack. The consumption of playing cards is principally confined to those having the Spanish faces. Cards with American faces are used for playing poker or whist, and their sale is confined to the clubs and foreign residents. Playing cards are manufactured in Montevideo by the Compañía General de Fósforos, which has a special department of its lithographing plant devoted to this purpose. Its annual production is about 1,500 gross, but this could be doubled or tripled if a market could be found for the additional production. The public, however, prefers to pay much higher prices for the imported cards than for the domestic, although they are not superior in quality. Sample No. 3 shows two grades of the domestic cards that have the largest sale. Packs containing 40 cards sell for $11 per gross and those containing 48 cards for $13.50 per gross.

Wall paper.—Each year wall paper is being used in increasing quantities in Uruguay. Nearly all of the new houses have the walls papered instead of painted or calcimined, as was formerly the custom. This is true not only of the better-class residences, but also of the largest apartment houses. The use of such paper however, is not as yet so general as in Argentina. Great Britain has always supplied the market with the greater part of its imports. In 1915 the imports were valued at $17,502, of which Great Britain supplied $8,275. In this year there were also much larger imports from the United States than ever before. Previous to the war imports from the United States were less than 1 per cent of the total. English paper formerly came in rolls 12 yards long by 21 inches wide, but this size has been largely discontinued and at the present time the English paper is being supplied in 9-yard rolls, 18 inches wide. Paper from France and Germany was imported in 8-meter (8¾-yard) lengths, and this is really the most convenient size, because the majority of the walls in Uruguay are 4 meters high and two lengths can be cut from one roll. In the new buildings the walls are lower, and for papering these there is no objection to the American standard rolls of 16 yards. If American manufacturers, however, would make an 8-meter roll in order to meet the requirements in other countries, it would better meet the desires of the Uruguayan buyers. The paper for which there is the greatest demand retails at from 25 to 50 cents per roll, but there is some demand for very high-priced paper such as satin and embossed finish, which retails at from 25 to 50 cents per running yard. Designs are as varied as in the United States, but fashions do not change as often. Just at present bright flowered effects are popular in the cheaper papers and solid colors in the more expensive. Borders are frequently used at both top and bottom. There are six dealers in wall paper in Montevideo who supply the trade in the city as well as in the interior.

Photographic paper.—Four dealers in photographic materials in Montevideo supply professional and amateur photographers with their paper. All of these handle American paper, which they buy from the Buenos Aires branch of an American company. Until recently German, Belgian, English, and French papers were obtainable, but only American and English papers are on the market at present. The art of photography is well developed in Montevideo, and there are four or five large studios that do excellent work. The demonstration of the advantages to be derived from the use of American paper (which has resulted successfully in Argentina) will be extended to Uruguay by the same American company, which has been the pioneer in this field. Photographic paper is imported in rolls and packages, and the same sizes used in Argentina are also desired in Uruguay.

Carbon paper.—The market for carbon paper is small. Typewriters are in general use in the commercial establishments and Government offices in Montevideo, but the practice of making carbon copies of letters is not common. The annual consumption is about 1,000 boxes, of which possibly one-third is bought by the Government. The greater part of the sales are made by the representatives of American typewriter concerns in Montevideo. There are a number of these agencies, but three of them do the bulk of the business. All the stationers handle carbon paper, but only two of these (Barreiro & Co. and A. Soury & Co.) buy in sufficient quantities to be of importance to American manufacturers. One American concern has its own branch house in Montevideo and supplies the small dealers directly from stock. Some of the larger banks and transportation companies are supplied directly from their home offices abroad. Paper for the Central Railway is bought by the purchasing agent in London, and often American paper is supplied by that officer. American carbon paper is well established on the market, and there is no reason why it should not continue to be sold in larger quantities than that from any other country. Propaganda work by manufacturers showing the advantages of using the best grades of carbon paper will tend to increase sales, as will the introduction of modern filing systems. Carbon paper is imported in boxes 8 by 10½ inches and 8 by 13 inches. Purple paper is in the greatest demand.

Roofing paper and wall boards.—Ready roofing is sold in Montevideo by three concerns representing American manufacturers. Efforts have been made by all of these to increase sales, and considerable propaganda work has been done, but as yet the consumption is small and hardly exceeds 2,000 rolls per annum. These firms carry small stocks of paper, which they sell directly to consumers. Efforts to establish branch agencies throughout the interior have not been successful. Construction of roofs in the cities is very much the same as in other South American countries. Nearly all the roofs are flat and these are covered with native tiling. In some sections of Montevideo a few modern residences have been constructed, and asbestos or felt shingles have been used on the roofs. An American manufacturer of wall board has an agent in Montevideo who has been energetic in his effort to introduce this product. Advertisements are carried in an engineering magazine, and samples of the material are at the Builders' Club in Montevideo, but its introduction has been slow.

Sandpaper.—Sandpaper to the value of about $10,000 is consumed annually in Uruguay. Before the war 50 per cent of the imports came from the United States and the remainder from Germany, Great Britain, and Spain, but in the last three years the percentage of paper from the United States has increased. American paper is regarded as superior to that from any other country, and prices are equally low. Sandpaper is sold by hardware dealers and is bought from commission merchants, either through local representatives or directly from New York or European offices.

MARKET FOR PRINTING MACHINERY AND SUPPLIES.

The prospects for the sale of American printing machinery and supplies in Uruguay are excellent. The market is limited because the country is small, and many years will probably elapse before its population is increased and its resources developed to such an extent as to make many additional printing plants necessary. On the other hand, the master printers now operating in Montevideo are alive to the importance of improving their plants by the installation of more modern machinery. Labor is becoming more difficult to secure, and wages have increased materially within the past few years. The packing houses and manufacturing plants, in addition to supplying a great volume of work, are more exacting in their requirements. Color processes are demanded, and the old methods of lithography from stone must give way to more modern methods. The newspapers are increasing in circulation, and presses of greater speed and capacity will be required.

The interior cities are growing in wealth and population. Municipal improvements are either proposed or actually under way, and their completion will be followed by an expansion of the newspapers. Hand composition will give way to machine composition, and antiquated presses will be replaced by modern machines.

Practically no effort has been made to sell American printing machinery up to the present time; but despite this fact a number of machines have been installed and are giving such satisfaction that the purchase of others is contemplated. More attention is now being given to the market by representatives of American manufacturers. One American company, which carries a full line of American machinery in its Buenos Aires office, sends a salesman to Montevideo at frequent intervals and keeps in touch with all prospects. Often owners of printing establishments in Montevideo are induced to visit the Buenos Aires showrooms and see late types of American machinery in operation. The establishment of a branch house in Montevideo by this company has been considered, but there are several difficulties in the way. Perhaps the most important of these is the fact that the large consumers of paper in Montevideo are printers who also sell paper to small printers, and the opening of an American house that would also sell directly to these concerns would be resented by the large purchasers. There is not sufficient business in the machinery and printers' supply line to warrant the establishment of an exclusive house. Revenue to be gained from the sale of paper and paper products would be necessary to make the venture a financial success. The only American house representing printing-machinery manufacturers is a branch of an American firm in Buenos Aires which was established in Montevideo in 1915. No machines are carried in stock.

Previous to the war the printing-supply business in Montevideo was controlled by the large Buenos Aires firms that specialized in this business. The Italian firm of Serra Hermanos maintains a branch in Montevideo and formerly secured a large part of the business. The German firms of Curt Berger & Co. and Hoffmann & Stocker sent salesmen to Montevideo every week and filled orders either from their Buenos Aires warehouses or directly from the German manufacturers. As in Argentina, the long credits given by these European firms had an important effect upon their sales. Machinery was delivered on a small cash payment, and the remainder of the purchase price was divided into monthly payments extending over three years.

Newspaper presses.—There is no immediate prospect for the sale of perfecting newspaper presses. All but one of the newspaper plants in Montevideo are equipped with Marinoni (French) presses, which were sold by the Italian firm of Serra Hermanos. Nearly all of these machines are practically new and seem to be giving satisfaction. Only two publishers are considering the question of installing new presses, and both of these state that several years will probably elapse before they will need to make a change. Certainly until conditions become more settled and the freight situation becomes normal, there is but little prospect for the sale of machines of this class. In addition to the Marinoni machines, there is a duplex flat-bed perfecting press, manufactured by the Duplex Printing Press Co., of Zurich, used by El Bien. Three dailies and one triweekly are printed on this machine, and its capacity is overtaxed. It should be replaced by either a more modern press of the same type or a small rotary. None of the newspapers in the interior have circulations that warrant the installation of perfecting presses, but there should be a market for several cheap cylinders of the drum type.

Cylinder presses.—Within the last three years three American two-revolution presses have been installed in Montevideo. Two of these are Miehles and the other a Babcock "Optimus." All three of these machines are equipped with automatic feeders and are producing from 1,800 to 2,000 printed sheets per hour. German presses of the same size are running on the same floor, with a production of less than one-half of that turned out by the American machines. Not only is the quantity produced by the American machine greater, but the register is better and the operation is simpler. There are many types of European machines to be found in the printing shops of Montevideo. German presses from the Frankenthal and Augsburg factories and French presses manufactured by Marinoni and Voirin are found in the greatest numbers. As a rule, these machines have been in operation for a number of years. There are a few modern presses such as those made by Koenig & Bauer and Albert & Co.

Lithographing presses.—Lithographing presses used in Montevideo are about equally divided between machines made in France and in Germany. Only one American machine is to be found in the country, and that is a Hoe press in operation at the plant of the Compañía General de Fósforos. There is little prospect for the sale of other machines of this type. The use of lithography from stone is giving way to the printing of color work on letter-press cylinders. Little or no interest is shown in offset printing, although two offset presses have been installed. One of these is an Albert (German) press in the plant of Barreiro & Co., and the other is a Voirin (French) press recently installed by the Imprenta Nacional. Neither of these machines has demonstrated to other lithographers the value of adding similar presses to their equipment.

Platen presses.—As in other countries of South America, Chandler & Price job presses are to be found in Uruguay in considerable numbers. Printers have insisted on purchasing these machines from German jobbers in spite of the fact that German-made presses of similar type could be bought for less money and on much more favorable terms. Presses of German manufacture, however, are to be found in the greatest number, and most of these are of the "Victoria" or "Fenix" type. There are a few old Marinoni presses and some of the modern "Ideale" machines, made by the Augusta factory at Turin, Italy. Up to the present time there has been no demand for automatic jobbers, as long runs are much rarer than in the United States. In the plant of Soury & Co. are installed three English "Falcon" semiautomatic jobbers that are used for the printing of envelopes.

Typesetting machines.—All the newspaper plants of Montevideo and several of the commercial establishments are equipped with typesetting machines, but none have been installed elsewhere in Uruguay. There are 68 machines now in operation, of which 64 are linotypes and 4 monotypes. Of the former one-half are Canadian machines, and the remainder were manufactured in the United States. The Canadian machines are old models that should be replaced with newer ones, and several of the newspapers are considering the question of trading in these old machines. A more active selling campaign on the part of American manufacturers would result in larger sales. Of the monotypes installed in Montevideo, only two machines are in operation.

Cutting machines.—German cutting machines form a part of the equipment of every printing office in Montevideo with the exception of two of the largest plants, Barreiro & Co. and the Compañía General de Fósforos, where old German machines have been replaced with modern American automatic cutters. The former has installed a Seybold and an Oswego, and the latter two Seybolds. All these machines are giving complete satisfaction, and other printers who have seen them in operation have expressed a determination to buy similar cutters as soon as possible. If a market could be found for some of the German machines at least 6 or 8 American cutters could be sold in Montevideo at once. Of the German machines in operation those manufactured by Ch. Mansfeld and Karl Krause, both of Leipzig, are found in the greatest numbers.

Ruling machines.—The high tariff has made the manufacture of blank books profitable, and, in consequence, there are a larger number of ruling machines to be found in Montevideo than in cities of similar size elsewhere in South America. The plant of Soury & Co., which makes a specialty of blank books, is equipped with eight machines. Four of these are disk and the others pen rulers. Other plants have from two to four machines each. In general, printers are more partial to the disk rulers, as they claim that their operation is much simpler and the production much greater. German and French manufacturers dominate the market in this line, and American ruling machines are practically unknown.

Folding machines.—Editions of books printed in Uruguay are small, and there are few magazines or publications with circulations exceeding 2,000 copies. The market for folding machines is, therefore, limited. Only four machines are in operation in the country, all of which were made at the Brehmer factory in Germany. There is no prospect for the sale of additional machines.

Bindery equipment.—German machines exclusively are used in binderies. Nearly every plant in Montevideo has one or more Brehmer stitching machines, ranging in size from small hand-staplers to elaborate machines for sewing books. The latter are principally used for blank books and give excellent satisfaction. The only American machines to be found are a Boston wire stitcher and a Smythe book-sewing machine. The outlook for the sale of American stitching machines is not promising unless the price of the Brehmer machines is advanced after the conclusion of the war. There are no prospects for the sale of additional machines at present. Offices are well equipped with perforating, numbering, and stamping machines. American numbering machines to be locked in forms have been introduced in recent years and their use is increasing.

Type.—Exactly the same conditions regarding the use of type as were noted in Argentina were found to exist in Uruguay. Type in use is made on the Didot (French) body, with American height. The introduction of type cast on the American point system will require the discontinuance of the use of all type now found in Uruguay. No stocks of type are carried in Uruguay, and the printers are supplied by the Buenos Aires jobbers directly from their stocks in that city. Some of the large printers are eagerly looking forward to the time when American type cast on the Didot system will be available. They claim that they can not obtain from European manufacturers the modern faces required by their customers.

Printing and lithographing ink.—The annual consumption of printing and lithographing ink is about $50,000 per annum, all of which is imported. Imports are about equally divided between news ink, lithographic ink, and job ink. Previous to the war lithographing and job inks were principally sold by the German printers'-supply houses of Buenos Aires, but since the establishment of a branch of an American company with full stocks, the latter concern has secured the greater part of the business. News ink was principally sold by the French firm of Lorilleux, but recently American ink has been introduced on the market with considerable success.

Binder's cloth.—The quantity of binder's cloth consumed in Uruguay is small. The editions of printed books are limited, and cloth is principally used in the binding of blank books. Stocks are carried by Barreiro & Co. and Soury & Co. Both of these concerns have been buying directly from British or European manufacturers, and there has been only a relatively small sale of American cloth.

PARAGUAY.

INTRODUCTION: DESCRIPTION OF COUNTRY.

Paraguay is the least known of the South American countries. It is rich in natural resources,but wars with its neighbors, lack of a stable currency, and inability to secure foreign capital and immigration have retarded its development. During the past decade there has been a large increase in its population, its foreign trade has shown substantial progress, public education has been established on a firm basis, and its rich resources are being exploited. Those who are familiar with the history of the country are confident that it is on the eve of a great commercial and industrial expansion.

Paraguay is an isolated country lying almost in the heart of South America and surrounded by Argentina, Brazil, and Bolivia. Its area is about 196,000 square miles, and its population about 700,000. Of the latter 100,000 are wild Indians living in the Grand Chaco, an almost separate country divided from Paraguay proper by the Paraguay River. It is estimated that not more than 50,000 of the inhabitants are consumers of imported merchandise and the greater part of these live in Asuncion, the capital. The language of the country is Spanish, but the Guarani, the mother tongue of the Indian population, is widely spoken among the lower classes.

The country has two outlets—one by river down the Paraguay to the Parana and thence to the Uruguay and the ports of the River Plate, and the other by rail from Asuncion to Buenos Aires. There are three passenger steamer lines between Asuncion and Buenos Aires, with sailings three times a week. The service compares very favorably with that on rivers and lakes in the United States. The up-river trip requires five days and the down trip three days. The one-way fare is $43.56 and the round trip $69.81. The railway journey requires 53 hours. A through train, with sleeping and dining cars, is operated once a week between Asuncion and Buenos Aires. From Asuncion to the sea down the Paraguay, Parana, Uruguay, and Plate Rivers is 1,200 miles. All freight from the United States or Europe for Asuncion is transshipped at either Buenos Aires or Montevideo. The freight rate from both ports is the same. Some merchants prefer the first port and others the second. As a rule freight is cleared from Montevideo in less time and at less cost than from Buenos Aires. The present rate between either port and Asuncion is $5.63 per ton of 40 cubic feet.

The only city of interest to exporters is Asuncion, which is situated on the eastern bank of the Paraguay River, 1,200 miles from the ocean, 1,050 miles from Buenos Aires, and 6,770 miles from New York. It has a population of 80,000 and is the center of the commercial, financial, and political interests of the country. During the past five years it has made substantial progress. Many new buildings have been erected, and an electric street-car and lighting system has been installed. Merchants are progressive and their stores are stocked with goods from all parts of the world. A number of the large concerns have purchasing agents in Buenos Aires, New York, or European cities buying a large part of the merchandise that they sell. It requires two weeks for the ordinary salesman to make the trip to Asuncion and visit the trade, but this time can be reduced three days if the going trip is made by rail. The cost is about $125. Some travelers stop en route at the Argentine cities of Rosario, Parana, and Corrientes and pick up some business. The commercial traveler's license in Asuncion is about $55, but most travelers avoid its payment. Unless a salesman has a number of lines, and also has arrangements with Buenos Aires houses to look after future orders, he will hardly be able to secure enough business to justify the time and expense necessary to make the trip. In the paper and printing-machinery lines the trade is thoroughly canvassed by salesmen of Buenos Aires wholesalers.

RATES OF EXCHANGE.

One of the most discouraging features of business in Paraguay is the fluctuating value of the Paraguayan money. Paraguay is one of the Latin-American countries whose finances are on a basis of inconvertible paper of fluctuating value. There is no coinage of gold or silver, and all the internal commerce of the country is conducted in depreciated paper currency issued in denominations of 50 centavos and upward. The rates of exchange are based on the price of Argentine paper currency, and change from day to day according to the demand. At present there are two rates—one established by the Oficina de Cambios, a Government institution, and the other by the Chamber of Commerce. The first rate is used for the conversion of all Government charges, such as duties which are assessed in Argentine gold, and the second for all commercial transactions. At the time this report was written (August, 1917) the difference between the two rates was nearly 20 per cent. The value of the Paraguay paper peso has been gradually declining for the past 20 years, with now and then a temporary halt. In 1900 it was worth $0.12, in 1905 $0.093, and in 1909 $0.056. In 1914, shortly after the beginning of the war, it required 41 pesos to equal one American dollar. In August, 1917, the peso was valued at $0.028. The fluctuations amount to as much as 100 centavos on an American dollar in a day. Merchandise which to-day costs $100, equaling 3,500 pesos, may be purchased in a month for 3,000 pesos, or, on the other hand, may cost 4,000 pesos. This uncertainty puts business on a speculative basis and is responsible for the high retail prices. Merchants as a rule figure their costs in gold, and when converting to pesos add 50 per cent to protect themselves against a drop in the value of the paper currency. Many reasons are assigned for the decline in the peso, but it is generally agreed that it is largely due to speculation and the efforts of a few exporters to keep its price as low as possible. The Oficina de Cambios was established by the Government with the object of maintaining a fixed relative ratio between the value of gold and that of the paper peso, but it was not provided with sufficient resources to accomplish this purpose. The amount of paper money now in circulation is 125,000,000 pesos, and the foreign debt is less than $6,000,000.

RECENT ECONOMIC CONDITIONS.

Paraguay, like other South American countries, has been seriously affected by the war. For 10 years prior to 1913 the imports exceeded the exports by 25 per cent, and in the latter year were 40 per cent greater. In the early months of 1914 importers were having some difficulty in meeting their obligations for goods imported during the previous year. The country was already in serious financial difficulties when the war started, and the demand for immediate liquidation of accounts by European creditors produced a crisis. There was a small run on the banks, and the Government was compelled to declare a bank holiday from August 6 to August 14, 1914, in order that the banks might have time to consider the situation. As a temporary measure 25,000,000 pesos were issued the Banco Agrícola, a semi-Government institution, in order that it might rediscount the bills of other banks. When the banks opened public confidence had been restored and there was no need of further relief. The Government declared a moratorium of all obligations payable in gold that were contracted prior to August 14, 1914, and this has been extended from time to time. On January 31, 1916, it was amended so as to provide for the payment of 4 per cent of the gold obligations every three months during 1916 and 6 per cent every three months during 1917. It will probably be extended for another year. Few importers took advantage of the moratorium, and, with few exceptions, the commercial establishments of the country passed through the trying times without serious difficulties. Finances of individual firms are said to be in better condition at present than at any time during the past 10 years. During the last half of 1914 and all of 1915 very few goods were purchased abroad, and the imports for these years were made up of goods that were ordered previous to the war. In the summer of 1916 stocks were very low and merchants began to purchase goods in limited quantities. Buyers were still conservative in the summer of 1917. In 1915, for the first time in the history of the country, the exports exceeded the imports. Exports amounted to $5,419,606 and imports to $2,321,682.

The recent establishment of two packing houses and the adoption of a meat-inspection law that will permit the entry of Paraguayan meats into the United States will have an important effect upon business in the country. One of these houses is being erected by an American company, which is preparing to invest more than $3,000,000. A large plant where 500 head of cattle will be killed daily is being erected at San Antonio on the Paraguay River, 15 miles below Asuncion. The company owns 470 square miles in the Grand Chaco which is also being developed. The production of quebracho extract will be an important part of the company's activities. Another company (Compañía Paraguaya de Frigorífico y Carnes Conservadas), which is under American management, has recently completed a plant opposite Asuncion for packing meat products.

FOREIGN COMMERCE.

The total trade of Paraguay is rather small, but since 1900 it has shown a noteworthy increase. According to Paraguayan statistics the foreign trade has been as follows:

Years.	Imports.	Exports.	Years.	Imports.	Exports.
1859	$1,539,648	$2,199,678	1908	$3,930,400	$3,731,745
1880	1,030,408	1,163,418	1909	3,533,723	4,968,525
1885	1,476,000	1,660,000	1910	6,194,733	4,455,329
1890	2,725,611	3,901,589	1911	6,460,670	4,569,825
1895	1,958,250	1,308,662	1912	5,163,329	4,087,477
1900	2,652,067	2,555,924	1913	7,912,997	5,433,843
1905	4,514,766	2,733,950	1914	4,969,234	4,423,909
1906	6,102,934	2,601,068	1915	2,321,682	5,419,605
1907	7,249,564	3,122,846	1916	4,516,223	4,691,516

The standing of the leading nations in the foreign trade for the years 1913, 1914, 1915, and 1916 is shown in the following table:

Countries.	Imports.				Exports.			
	1913	1914	1915	1916	1913	1914	1915	1916
	Per ct.	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*
United Kingdom	28.6	22.7	33.0	38.0	....	2.5	3.6	1.7
Argentina	13.4	18.0	32.7	34.2	62.0	59.0	64.7	73.5
United States	6.0	8.3	9.0	12.4	....	.3	5.4	4.8
Italy	6.0	6.9	7.2	5.6	.2	.7	.7	3.0
Spain	5.3	5.4	4.8	3.8	.5	1.7	1.2	7.7
Germany	27.6	27.0	6.9	.7	21.8	17.6	.1	....
France	6.6	5 0	2.4	1.5	.6	1.1	1.2	2.7
Uruguay	.7	.8	1.3	1.1	12.3	13.0	10.2	4.7
All others	5.8	5.9	2.7	2.7	2.6	4.1	12 9	1.9
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

EDUCATIONAL PROGRESS.

Paraguay is making remarkable progress in public education. The attendance at its public schools has more than tripled in the past 15 years. In 1902 the number of scholars was 24,702, in 1913 it was 68,625, and in 1916 it was more than 80,000. The number of teachers has increased from 658 in 1902 to 1,558 in 1916. The courses of instruction in the primary grades have been greatly improved and a number of institutions of higher learning opened. Among the latter are a university, three high schools, and four normal schools. In the School of Commerce in Asuncion there are 630 pupils, many of whom are learning English.

STATISTICS OF PAPER IMPORTS.

Paraguay has a smaller per capita consumption of paper than any other country in South America. In normal times the total value of all paper and paper products used in the country is about $60,000 per annum. In 1913, when all imports were larger than ever before, the value of the paper brought in was more than $70,000, but in 1915 it was less than $40,000. The following table taken from official sources shows the imports in pounds for the years 1913, 1914, 1915, and 1916:

Articles.	1913	1914	1915	1916
	Pounds.	*Pounds.*	*Pounds.*	*Pounds.*
Wrapping paper, cover paper, and colored tissue paper	502,828	143,750	176,028	239,562
News print	352,292	177,584	295,675	322,596
Writing and printing paper	335,104	237,054	82,946	225,997
Blotting paper, toilet paper, and oiled paper	9,916	8,153	1,020	4,008
Cigarette paper	4,034	7,084	3,630	4,622
Paper, in rolls, for telegraphic instruments	2,094	1,529	....	....
Photographic paper	1,208	792	178	334
Wall paper	1,045	95	174	....
Carbon paper	150	67	565	106
Ordinary cardboard and strawboard	165,433	62,053	65,841	68,257
Coated cardboard	22,330	40,009	2,630	27,159
Bristol board	27,913	19,302	38,107	3,397
Board for playing cards	....	....	5,517	....
Blank books, bound in paper	53,798	43,665	3,650	15,914
Blank books, bound in boards, cloth, or leather	27,403	22,623	1,047	2,268
Printed books	28,857	36,588	1,335	8,527
Letter and invoice files	3,744	4,617	229	130

Imports from specified countries during 1916, at the valuation fixed by the tariff, were as follows:

Articles.	Argentina.	France.	Italy.	Norway.	Sweden.	United States.	Other countries.	Total.
News print	$1,749	....	....	$980	$3,315	$1,891	$666	$8,601
Wrapping	821	$15	$8,669	81	....	58	2,965	12,609
Printing and writing	11,454	9	282	....	....	8,112	1,625	21,482
Photographic	....	104	....	....	....	87	103	294
Cigarette	....	1,119	....	....	....	....	97	1,216
Copy, tissue, toilet, blotting	109	....	162	....	....	187	69	527
Silk	328	....	....	....	....	....	15	343
Carbon	....	....	....	....	....	118	15	133
Total	14,461	1,247	9,113	1,061	3,315	10,453	5,555	45,205

As in other South American countries, arbitrary values are used for statistical purposes, and in 1916 these were about one-third lower than actual values.

Prior to the war paper consumed in Paraguay came principally from Germany, Italy, and Spain. Germany supplied about 50 per cent of the imports and the other two countries about 20 per cent each. Imports from Germany consisted of printing and writing paper, cardboard, envelopes, and blank books made in that country; news print manufactured in Norway and Sweden; and strawboard from mills in the Netherlands. Italy supplied wrapping paper and cheap writing paper. Spain furnished wrapping paper, cigarette paper, playing cards, and printed books. There were practically no imports from the United States or Great Britain. Since the beginning of the war paper has been imported from the United States, Norway, Sweden, and Argentina. News print has formed the bulk of the imports from the first of these countries and combined printing and writing paper from the last three. Italy and Spain have continued to supply wrapping paper, cigarette paper, and cheap writing paper.

METHODS OF PURCHASING.

Practically all of the paper used in Paraguay, with the exception of wrapping paper, is purchased by five Asuncion importers or by the Government. The importers in turn sell to the printers, newspapers, and stationers. The largest importer in normal times is a German-Spanish firm (Klug y Marés, S. A.), carrying a small but complete line of all grades of paper for the printing trade. This firm is closely affiliated with a Buenos Aires wholesale house. It was incorporated in 1916, and has among its stockholders several of the printers of Asuncion. Two of the other importers sell paper in connection with other merchandise. One of these (Rius y Jorba), selling news print and wrapping paper principally, is the most important firm in Paraguay. It has branch stores in Ipacarai, Paraguari, Carapegua, Villarica, and Encarnacion. This is a Spanish firm and has a purchasing office in Barcelona, Spain. Another of the importers is a German firm (Sociedad Introductora S. A. Bazar Americano), having a drygoods and general merchandise store. At the present time it is selling the newspapers nearly all of the paper that they use. A fourth is the largest firm of stationers in the country (Quell y Carron), who wholesale writing and printing paper, blank books, etc. The only printer that imports paper direct is a German (H. Krause). With one exception (Rius y Jorba), all of these firms are on the British statutory list.

The Paraguayan Government is the largest single consumer of paper in the country. Its purchases in normal times amount to about $18,000 per annum, and consist principally of writing and printing paper, envelopes, blank books, carbon paper, etc. Supplies are generally bought from local dealers after bids have been tendered, but in the last year paper used in the Government printing office has been bought from Buenos Aires dealers.

In normal times importers receive the greater part of their supplies direct from European mills. In some cases orders are placed through representatives of mills located in Buenos Aires or from wholesalers in that city. When paper is bought from the latter concerns shipments are made direct from the customhouse in Buenos Aires, where stocks are held in bond for that purpose. In the last two years the American wholesale houses in Buenos Aires have obtained considerable business from Paraguay. Both of these concerns send a salesman to Asuncion two or three times a year.

TERMS, PACKING, QUOTATIONS, ETC.

There is no uniformity in the terms granted to Paraguayan importers. One of the principal concerns discounts its bills for cash; another, buying principally in Europe, makes settlements twice every year; two others, buying in Buenos Aires, are granted five months from date of sale by wholesalers of that city; a fifth is restricted to a credit of 30 days. Asuncion wholesalers give from 30 days to 5 months. Newspapers are generally required to make weekly settlements.

Stronger packing is required for shipments to Asuncion than to Buenos Aires. Practically all freight is forwarded by the river route, and at seasons of the year when the water is low transshipment from large to small steamers is sometimes required. Freight is also discharged in lighters upon arrival at Asuncion during certain seasons of the year. Cases such as are used for shipment to Argentina should be reinforced with wooden strips and iron straps. The use of the bale is preferable for news print, cheap printing paper, and cardboard. Paper should be ream-wrapped before it is baled. Tin-lined cases should always be used for gummed paper.

Quotations should be given in American gold per 100 kilos, c. i. f. Buenos Aires or Montevideo, or better still in Argentine gold (1 peso equals $0.965). In normal times importers will not buy on f. o. b. New York quotations. Metric-system weights and measures should be used, and the weight of paper per square meter should be given. Correspondence in Spanish is essential. Credit information can be obtained from banks and commercial agencies in Buenos Aires or from the Banco Mercantil, Banco de la República, or Banco Agrícola of Asuncion.

CONDITION OF THE PRINTING INDUSTRY.

The only printing offices of any size in Paraguay are in Asuncion, where are located the Government printing office, four medium-sized commercial offices, four small job plants, and the printing office of a match factory where playing cards are made. Outside of the capital there are 8 or 10 small combined newspaper and job plants. None of the printers has adequate equipment, and the work produced is of the simplest character. While there are several modern cylinder presses in the country the greater part of the machinery is very old.

The Government printing office, which was established in 1910, is the largest in the country. Its equipment consists of two German stone lithographing presses, two French letter-press cylinders, five German platen presses, and antiquated bindery machines. The 1917 budget of the Paraguayan Government carries an appropriation of $15,000 for the purchase of new machinery. The largest of the commercial establishments is owned by a German (H. Krause). The office is equipped with a German cylinder press, two German stone lithographing presses, seven platen presses, a disk ruling machine, and miscellaneous bindery machines. Another plant has four cylinder and seven job presses, and the other two principal establishments have one cylinder and several job presses each.

DAILY NEWSPAPERS AND OTHER PUBLICATIONS.

Paraguay's stated publications consist of seven afternoon newspapers, one triweekly, four weeklies, and one semimonthly published in Asuncion, and six weeklies published in other towns in the country. Two of the dailies (La Tribuna and El Diario) have circulations in excess of 3,000 each and print a fair quality of telegraphic news, which they receive from correspondents in Buenos Aires. Their plants are equipped with composing machines and German cylinder presses. The other dailies are smaller in circulation and are principally devoted to local and political news. They are printed on old cylinder presses, principally of French manufacture. All of the papers are sold for 1 peso (2.8 cents) each. The foreign subscription prices are from $10 to $12 per annum, and the advertising rates about 10 cents per inch. All of the publications are printed in the Spanish language. The publications other than the dailies are devoted to various interests. One represents the German colony; two others are devoted to commercial and financial matters, and another to religious subjects.

Printers in the job plants and newspaper offices of Asuncion receive from 600 to 900 pesos ($17 to $25) per month and work nine hours per day.

TARIFF ON PAPER AND PAPER PRODUCTS.

Only a small part of the paper that enters Paraguay pays any duty, as the tariff law of the Republic provides that all articles used in printing shall be admitted free of duties. There is a tendency, however, on the part of the authorities to restrict the free entry of certain articles, and in recent years duties have been assessed on envelopes, ruled paper, cardboard, and bristol board. There is no question of the free admission of news print and printing paper of all grades and colors when consigned to printers, newspapers, or wholesale paper dealers. Wrapping paper of all grades, cigarette paper, blotting paper, toilet paper, photographic paper, cardboard, bristol board, envelopes, carbon paper, and blank books are the principal classes upon which duties are collected. The Paraguayan tariff on paper and paper products is very similar to that of Argentina. Ad valorem duties are assessed on official valuations, which in nearly all cases are the same as in Argentina. There are no specific duties. Forty-two per cent of the official valuation is assessed on all grades of paper, and 62 per cent on blank books and manufactured articles of paper. In addition, there are certain charges for storage, cranage, and statistical purposes. The official valuations per pound of the principal grades are as follows: Wrapping paper, $0.052; toilet paper and blotting paper, $0.131; cigarette paper and blue-print paper, $0.262; photographic paper, $0.875; typewriter carbon paper, $1.532; strawboard and pulp board, $0.035; coated cardboard, $0.053; bristol board, $0.11; blank books, bound in paper, $0.131; blank books bound in cloth or leather, $0.306; blank envelopes, $0.131. Playing cards pay 87 per cent of a valuation of $9.65 per gross.

MATERIALS FOR MAKING PAPER.

No paper is manufactured in the country, and no careful study of the materials in Paraguay suitable for making paper has been made. There are no doubt large quantities of wood in the extensive forests of the country that would be suitable for making paper, but transportation facilities to make it available are lacking. The following information was furnished by an official of the Agricultural College of Paraguay

> The best plants for the fabrication of paper in this country are the common species of palm, *Acrocomia totai*, *Copernicia cerifera;* then a good many creepers belonging mostly to the family Bignonae, for instance several species like *Arrabidaea*, *Adenocalymma*, and *Amphilophium;* some tall Gramineæ like the *Bambusæ* and other *Tacuaras* and canes, growing especially in the forests of the Alto Parana; and finally, perhaps some abundantly growing *Bromelaceæ*—for example, *Ananas sativus*, *Bromelia serra*.

METHODS OF ENTERING MARKET.

The best method of reaching the Paraguayan importers is through the Buenos Aires wholesalers, four or five of whom send traveling salesmen to Asuncion once or twice a year. Under the most favorable conditions these travelers are hardly able to secure enough business to pay expenses. Orders totaling $5,000 would be considered as exceptionally large. Some of the travelers make the small river ports between Buenos Aires and Asuncion and pick up enough business from these places to help out on their expenses. Commission merchants and representatives of paper export houses in Buenos Aires solicit the trade by correspondence. Just at present when there is a scarcity of paper in Paraguay it would probably pay an American exporter to have a local representative in Asuncion on a commission basis. The United States is so far away that in normal times it will not pay an American concern to solicit business by means of letters and samples sent from the United States.

FUTURE OF PAPER IMPORTS.

The future of the paper imports of Paraguay will depend almost entirely upon the development of the country along commercial and industrial lines. As has been pointed out, the country should have a larger purchasing power during the next few years than ever before. The high prices of agricultural and animal products and the greater facility for their ready disposal should stimulate all commercial transactions. The greater attention that is being paid to educational matters should result in larger importations of books and school materials. As the number of the illiterates is decreased the newspapers should have larger circulations. An increase of 100 per cent in the imports of paper and paper products can reasonably be expected within the next eight or ten years, but even with this increase the market will be so small and the competition so keen that it will hardly warrant the serious attention of American manufacturers. The present importers are all Europeans, and while at present they are purchasing considerable quantities of American paper there is little doubt that they will return to their former European connections when normal conditions are restored. The American wholesalers in Buenos Aires have made a good impression upon the trade in the last two years and will undoubtedly continue to do some business in Paraguay, but the volume will probably be much smaller than at present.

MARKET FOR PARTICULAR LINES OF PAPER.

News print.—The annual consumption of news print is about 130 metric tons, all of which is imported in sheets. It is principally used by the newspapers and printing offices, but a considerable part of the imports is used for wrapping paper. Newspapers at present buy from wholesalers in Asuncion, but in normal times two of the principal dailies, whose weekly consumption is about 50 reams each, buy from Buenos Aires dealers. Before the war practically all of the news print used in Paraguay was manufactured in the Scandinavian countries and imported from Hamburg. In 1916 imports were about equally divided between Norway, Sweden, and the

United States. Prices from all three countries were about the same, but manufacturers of the first two made no extra charge for the light weights that are in demand. The sizes principally used are 31¾ by 45½ and 28½ by 41 inches. The most desired weight is 47 grams per square meter, equivalent to 28 pounds per ream of 500 sheets, 22 by 34 inches, but lighter weights are also sold.

Printing and writing paper.—Combined printing and writing paper such as is used in Argentina comprises practically all of the paper that is used by the printers of Paraguay. In normal times the consumption is about 100 tons per annum, nearly all of which comes from Germany. Paper manufactured in Argentina meets the requirements of the market and would have a larger sale if the manufacturers in that country could meet the prices of the European factories. Since the war the imports from Argentina have largely increased. Owing to the scarcity and high prices of the combination paper, there have been comparatively large importations of machine-finish and supercoated paper from the United States to take its place. There is practically no demand for coated paper and only a small sale for sulphite bonds. Sizes and weights of writing and printing paper are the same as those used in Argentina.

Stationers import cheap cotton paper in light weights in note, letter, and foolscap sizes, and these sizes are used by the middle and poorer classes for correspondence purposes. In nearly all cases the paper is ruled at the factory in Germany, Spain, or Italy, from which countries all of the imports come. Writing pads in note and letter sizes have a good sale. These are manufactured by four of the stationers and printers. Some pads are also imported from Germany and Great Britain. There is a very limited sale for papeteries. One store carries boxes of 25 sheets of paper and 25 envelopes that cost from $0.15 to $0.25 each. Several notion stores handle cheaper grades. At the present time when the cheap German goods are not to be obtained, there should be a small sale for American papeteries.

Official stamped paper is purchased by the Government and sold for all official documents, deeds, leases, etc. The annual consumption is about 400,000 sheets, and it is customary to buy a supply sufficient for three years at a time. It will be necessary for the Government to place its next order within a short time, as the present supp lywill be exhausted by the middle of 1918. Sample No. 5 (see p. 165), which was made in Germany, shows the quality desired. The paper contains the coat of arms of the Nation watermarked in the center of each sheet. It is ruled and embossed at the factory, and the values are printed on each sheet at the Government printing office. In connection with the subject of stamped paper it is interesting to note that at the present rate of exchange the Government receives about $0.014 for a sheet of paper of the value of 50 centavos, a sum hardly sufficient to pay for the cost of the paper and its issuance by the revenue office.

Wrapping paper.—Practically all of the wrapping paper used in Paraguay is imported in small bales containing 1,200 sheets and weighing from 7.8 to 20.5 pounds each. Three sizes are principally used—12 by 15 inches, 14 by 18 inches, and 14½ by 20 inches. The sheets are folded once and gathered into hands of 15 sheets, 80 of the latter making a bale, which is held together by two strands of galvanized wire. Four small bales are strapped together for convenience in shipping. Grades of paper that have the largest sale are shown by samples Nos. 1 and 2. The first is principally imported from Italy and before the war cost $0.29 per bale for the small size (7.8 pounds) and $0.424 per bale for the larger (13.2 pounds), f. o. b. Italian ports. In the first size the cost was $0.037 per pound, and in the second $0.032 per pound. The higher cost of the first was due to the additional cost of packing the small size. Prices have advanced about 75 per cent since the war, but there is great difficulty in obtaining paper from Italy or Spain at any price. Sample No. 2 is similar to the bogus wrapping as manufactured in the United States. It is imported from both Italy and Spain and in pre-war times some came direct from Germany. The price from all of the European countries was about the same. In 1914 small bales, weighing 13.2 pounds, cost $0.462 each and large bales, weighing 20.5 pounds, $0.615 each. Prices have almost doubled in the past three years and difficulty has been experienced in obtaining supplies. In normal times the consumption of these two grades of paper is about 200 metric tons per annum, but since the war imports have declined to one-half of this amount. In place of new wrapping paper, the small stores are using old newspapers. In many of the stores signs are displayed requesting customers to bring receptacles to receive their merchandise. Wrapping paper is principally sold by wholesale grocers who buy it from commission dealers in Buenos Aires. The principal dealers (Rius y Jorba), who are the largest general importers in Paraguay, buy about 6,000 bales per annum.

There is practically no market in Paraguay for the better grades of wrapping paper. At times some of the stores import small quantities of kraft, imitation kraft, and manila for their use, but at the present time none of these grades are carried in stock by dealers. There is likewise no market for parchments, glassine, or greaseproof paper.

Cardboard and bristol board.—There are two factories in Asuncion where paper boxes are manufactured, and these concerns, together with the printers who use strawboard and pulpboard for binding, consume the imports, amounting to about 50 metric tons per annum. In normal times these consist principally of strawboard manufactured in the Netherlands and sold by Buenos Aires dealers or commission merchants. Recently there have been some importations of gray and brown bogus board made in Buenos Aires, but in normal times consumers in Paraguay can get better prices from the European manufacturers. Bristol board is used for visiting cards, menus, book covers, etc. In normal times it comes entirely from Germany. The annual consumption is about 10 metric tons.

Toilet paper.—Toilet paper has a very limited sale. The annual consumption is less than 150 cases. It is sold principally by druggists and dealers in hardware, stationery, and general merchandise. The hotels, which are the largest consumers, are supplied by Buenos Aires dealers on direct orders. German paper was sold to a greater extent than any other before the war, but now that American paper is being offered by the representatives of American concerns located in Buenos Aires the sales should increase.

Cigarette paper.—There are three small cigarette factories in Asuncion, which use about 5,000 pounds of cigarette paper per annum. Paper is purchased in Buenos Aires from representatives of Spanish and French manufacturers. American manufacturers will have considerable difficulty in obtaining any part of the business even at lower prices and longer terms than are offered by the concerns that have the business at present.

Blotting paper.—Blotting paper is principally purchased from Buenos Aires dealers, although one dealer imports paper directly from the United States. The annual consumption is about 100 reams. Light weight blotting in white and pink colors is preferred.

MARKET FOR MANUFACTURES OF PAPER.

Envelopes.—Large baronial envelopes, manufactured of lightweight colored paper and lithographed or printed on the inside, are exclusively used in Paraguay. They were imported from Germany before the war, and dealers had sufficient stocks on hand three years ago to last until recently. Supplies are now coming from Argentina, as it is difficult to obtain in the United States the envelope that is desired. The Argentine envelope is much inferior in quality and higher in price than those that came from Germany. American wholesalers in Buenos Aires have discontinued the attempt to sell envelopes such as are generally used in the United States and are now supplying the Paraguayan printers with envelopes made in Argentina.

Printed books.—Paraguay forms a very limited market for printed books. The six bookstores in Asuncion carry small stocks of novels in Spanish, some historical works, and schoolbooks. There is no sale for books in English, as the number of English readers is less than a hundred and they receive their supplies of reading matter by mail. Several hundred persons are studying English in commercial schools, and in consequence there is a small sale for English-Spanish dictionaries and language methods.

All the books used in the public schools are purchased from Buenos Aires publishers, with the exception of a primary reader and a primary geography published by the Superior Council of Primary Education of the Republic. The first of these, "Mi Primer Libro" (sample No. 6), was printed in Germany before the war and cost about $0.11 per copy. The last edition of 50,000 copies was printed in Buenos Aires in 1917 and cost $0.265 per copy. An order for a new edition of 50,000 copies will probably be placed at the commencement of 1918. The second book, "Geografía de la República del Paraguay," was also printed in Germany in 1911. A new edition of 50,000 copies will be necessary in 1918.

Blank books.—Germany, Italy, and Spain were the principal sources of supply for blank books and press-copy books before the war. Since 1914 the importations have been very small and have come from Spain or Italy. The books that have the largest sale are the cheapest that can be manufactured. They are made of combined writing and printing paper and bound in paper, or cardboard with cloth backbone and corners. Italian-made press-copy books that cost about $0.30 each in normal times have the largest sale. The Government requires the use of three books by all commercial establishments—journal, inventory, and press-copy book. These must be stamped before being used, a charge of 4 centavos a page being made for this service. Special ruled books for the Government, banks, and large commercial establishments are made by local or Buenos Aires printers. Three of the Asuncion printers have facilities for making blank books on a small scale. There is no sale for loose-leaf books except in the pocket sizes.

Printed, lithographed, and engraved work.—Paraguayan bank notes are printed in New York and are far superior in appearance to those of other South American countries. Denominations run from 50 centavos to 10,000 pesos. Notes in circulation, especially the smaller denominations, are badly worn, and a large part of those in use should be withdrawn. As a 50-centavo note is worth only $0.014 at the present rate of exchange, there is not much probability of the Government having new notes printed. Postage stamps were formerly printed in New York but are now received from Buenos Aires. The Government is preparing to lithograph the stamps in the Government printing office at Asuncion. When this is done there will be a small sale for gummed paper. Souvenir postal cards, gift cards, calendars, engravings, and oleographs are sold by stationers and dealers in general merchandise. In normal times these came from Germany. Since the war there have been no importations. Some of the banks and large commercial establishments have their letterheads and blank forms printed or lithographed by Buenos Aires concerns.

Playing cards.—The annual consumption of playing cards is about 300 gross, of which one-half are manufactured in the country and the remainder imported. Domestic cards are made by a match factory equipped with two German stone lithographing presses. These machines are also used for lithographing match boxes. The wholesale price of the domestic cards, including the internal-revenue tax of 2 pesos ($0.057) per pack is 1,000 pesos ($28.57) per gross. Imported cards pay a duty of $8.40 per gross and an internal-revenue tax of 4 pesos ($0.114) per pack. Nearly all of the imported cards consist of the Spanish decks of 48 cards and are manufactured in Spain. The largest dealers (Rius y Jorba) have an office in Barcelona where the cards that they sell are purchased directly from the manufacturers. American playing cards are used for playing poker and bridge whist, but the consumption hardly reaches a dozen gross per annum.

Paper boxes.—Ordinary paper boxes are made in Asuncion by two manufacturers. Small druggists' boxes are purchased from Buenos Aires wholesale drug houses, which send their travelers to Asuncion once or twice a year.

Paper sacks.—There is no market for imported paper sacks in Paraguay. They are used only by a few firms, whose wants are supplied by a local manufacturer who makes sacks by hand. The installation of a small automatic sack machine is being considered by this manufacturer. In normal years a few hundred dollars' worth of fancy confectioners' sacks are imported from Germany.

Wall paper.—There is no market in Paraguay for wall paper. On account of the long seasons of hot weather walls are painted or frescoed.

Photographic paper.—Five professional photographers in Asuncion buy the greater part of the photographic paper that is imported. It is carried in stock by three dealers, one of whom handles French paper, another English, and a third German or Belgian. American paper is bought from Buenos Aires dealers. It is stated that there would be a larger consumption of American paper if it were stocked in Asuncion. Photographers say that it stands the climate better and gives more satisfactory results than that from any other country. The establishment of an agency in Asuncion by an American manufacturer of photographic paper should result in increased business. Before this is done the manufacturer should protect his trade-mark by having it registered in Paraguay. Some dealers have the habit of registering in their own name trade-marks of all the goods that they sell.

Carbon paper.—The use of the typewriter by commercial establishments is increasing in Asuncion, but the quantity of carbon paper that is consumed is small and hardly reaches 200 boxes per annum. Most of this is sold by dealers in typewriter supplies, although it is also handled by three of the largest stationers. Imports in normal times come from Germany, Great Britain, and the United States. At the present time American paper is the only kind that is to be found on the market.

Roofing paper.—The introduction of ready roofing paper in Paraguay will be more difficult than in other South American countries on account of the trying climatic conditions, the abundance of native tiling, the type of flat roofs used, and the high cost of all imported materials. Aside from tiling, galvanized iron is principally used, but roofs of this construction are to be found only in Asuncion. In the interior roofs are made of tile, mud, or are thatched. No roofing paper is carried in stock in Paraguay, and so far as could be learned no effort has been made to introduce it.

Sandpaper.—The hardware business is in the hands of German and Spanish firms who import small quantities of cheap European sandpaper directly from the factories. American paper is handled by one firm, Rius y Jorba, who state that it is the most satisfactory paper on the market.

MARKET FOR PRINTING MACHINERY AND SUPPLIES.

Paraguay has heretofore been a closed market for American printing machinery, as all the equipment in the country was sold by Buenos Aires dealers who were interested in pushing European machinery. The only American machinery to be found in the country at present consists of three linotypes and two platen presses. All the other machinery and type was manufactured in Europe. Now that the dealers are being canvassed by the American printers' supply houses of Buenos Aires, larger sales of American machinery may be expected. At the present time there are several good prospects. One of the principal dailies (La Tribuna) is considering the purchase of an American flat-bed perfecting press and an additional linotype. Its circulation and advertising patronage would seem to warrant their installation. The Government plans to buy new machinery for the Government printing office. In the budget for 1918 is included the sum of $17,400 for this purpose. Among the machines which it is expected will be purchased are two composing machines, a two-revolution cylinder press, two platen presses, an automatic cutting machine, a folding machine, a pen ruling machine, a book-sewing machine, two wire-stitching machines, type, and composing-room equipment.

APPENDIXES.

Appendix A.—PUBLICATIONS, PRINTING OFFICES, AND PAPER FACTORIES.

ARGENTINA.

DAILY NEWSPAPERS IN SPANISH, BUENOS AIRES.

La Prensa, Avenida de Mayo 567; morning daily; established 1869; 16 to 24 pages, 17½ by 24 inches; 35-inch rolls; circulation, 165,000. Equipment: Three R. Hoe & Co. 24-page and one R. Hoe & Co. 40-page perfecting press; nineteen Mergenthalers; photo-engraving plant. Foreign subscription price, $27 per annum; advertising rates, $3.55 to $6.70 per inch (see advertising rate card, exhibit No. 17).

La Nación, San Martin 344; morning daily; established 1870; 16 to 24 pages, 17½ by 26 inches; 35-inch rolls; circulation, 135,000. Equipment: One Goss 32-page, two Marinoni (French) 32-page, and one Augsburg (German) 24-page perfecting press; twenty-one Mergenthalers; photo-engraving plant. Foreign subscription price, $24 per annum; advertising rates, $2.15 to $12.90 per inch (see advertising rate card, exhibit No. 17).

La Razón, Avenida de Mayo 760; afternoon daily; established 1904; 10 to 16 pages, 17½ by 26 inches; 35-inch rolls; circulation, 50,000. Equipment: Two Marinoni (French) 32-page perfecting presses; fourteen Mergenthalers; photo-engraving plant. Foreign subscription price, $20 per annum; advertising rates, $1.60 to $3.70 per inch (see advertising rate card, exhibit No. 17).

La Argentina, 25 de Mayo 189; morning daily; established 1900; 8 to 12 pages, 15¾ by 22½ inches; 31½ and 63 inch rolls; circulation, 70,000. Equipment: One R. Hoe & Co. 32-page and one R. Hoe & Co. 16-page perfecting press; sixteen Mergenthalers; photo-engraving plant. Foreign subscription price, $20 per annum; advertising rates, $1.65 to $3.30 per inch.

La Época, Avenida de Mayo 769; afternoon daily; established 1916; 8 to 16 pages, 15¾ by 22½ inches; 33½-inch rolls; circulation, 40,000. Foreign subscription price, $23.56 per annum; advertising rates, $1.10 to $2.20 per inch (see advertising rate card, exhibit No. 17); printed by L. J. Rosso & Co.

El Diario, Avenida de Mayo 662; afternoon daily; established 1881; 12 to 20 pages, 14½ by 21½ inches; 43-inch rolls; circulation, 40,000. Equipment: Goss 32-page perfecting press; fourteen Mergenthalers; photo-engraving plant. Foreign subscription price, $20 per annum; advertising rates, $0.65 to $6.60 per inch (see advertising rate card, exhibit No. 17).

La Unión, Florida 391; afternoon daily; established 1915; 8 to 12 pages, 15¾ by 22½ inches; 31½-inch rolls; circulation 35,000. Equipment: Albert (German) 32-page perfecting press; twelve Mergenthalers; photo-engraving plant. Foreign subscription price, $20 per annum; advertising rates, $0.55 to $4.40 per inch (see advertising rate card, exhibit No. 17).

La Mañana, Suipacha 459; morning daily; established 1910: 12 to 16 pages, 13 by 19 inches; 38-inch rolls; circulation, 20,000. Equipment: Marinoni (French) perfecting press; seven Mergenthalers; photo-engraving plant. Foreign subscription price, $26 per annum; advertising rates, $0.66 to $1 per inch (see advertising rate card, exhibit No. 17).

Ultima Hora, Esmeralda 173; afternoon daily; established 1908; 8 to 12 pages, 15 by 22 inches; 30-inch rolls; circulation, 35,000. Equipment: Marinoni (French) 24-page perfecting press; five Mergenthalers; photo-engraving plant. Foreign subscription price, $20.12 per annum; advertising rates, $1.10 per inch.

Crítica, Cangallo 787; afternoon daily; established 1913; 8 pages, 16 by 23 inches; 32-inch rolls; circulation, 12,000. Foreign subscription price, $20 per annum; advertising rates, $0.55 to $1.10 per inch; printed by Sociedad Editorial Argentina.

El Nacional, Alsina 1662; afternoon daily; established 1852; 6 to 8 pages, 16 by 23½ inches; 48-inch rolls; circulation, 15,000. Equipment: Augsburg (German) 24-page perfecting press; five Mergenthalers. Foreign subscription price, $20 per annum; advertising rates, $0.55 to $2.20 per inch (see advertising rate card, exhibit No. 17).

La Vanguardia, Reconquista 675; socialistic daily; established 1893; 6 pages, 16¼ by 23 inches; 33-inch rolls; circulation, 40,000. Equipment: Koenig & Bauer (German) 16-page perfecting press; seven Mergenthalers. Foreign subscription price, $26 per annum; advertising rates, $0.86 to $2.20 per inch (see advertising rate card, exhibit No. 17).

La Gaceta de Buenos Aires, Rivadavia 655; afternoon daily; established 1911; 6 pages, 16 by 22½ inches; 32-inch rolls; circulation, 12,000. Foreign subscription price, $20 per annum; advertising rates, $0.50 to $2.20 per inch; printed by Sociedad Editorial Argentina.

Idea Nacional, Florida 409; afternoon daily; established 1916; 8 pages, 16 by 21¾ inches; 32-inch rolls; circulation, 10,000. Foreign subscription price, $14 per annum; advertising rates, $0.77 per inch; printed by Giornale d'Italia.

El Avisador Mercantil, Lavalle 1157; morning commercial daily; established 1898; 16 pages, 11 by 14¾ inches; circulation, 12,000. Equipment: Two Augsburg (German) cylinder presses; Marinoni (French) cylinder press; four Mergenthalers. Foreign subscription price, $20 per annum; advertising rates, $5.50 per inch per month (see advertising rate card, exhibit No. 17).

El Cronista Comercial, B. Mitre 1254; morning commercial daily; established 1906; 6 pages, 15 by 22½ inches; 30-inch rolls; circulation, 5,000. Foreign subscription price, $20 per annum; advertising rates, $7.70 to $16.50 per inch per month (see advertising rate card, exhibit No. 17); printed by Scheone Hnos. y Linares.

La Protesta, Humberto I, No. 1175; labor daily; established 1896; 4 pages, 14¼ by 20½ inches; circulation, 5,000. Foreign subscription price, $9.50 per annum.

La Tradición, Reconquista 387; afternoon daily; established 1880; 4 pages, 16 by 22 inches; circulation, 1,200. Foreign subscription price, $10.60 per annum.

Boletín Oficial, Bolivar 65; official daily; established 1882; 12 to 48 pages, 12 by 18 inches; 72-inch rolls; circulation, 6,000. Subscription price. $5.28 per annum; advertising rates, $0.44 per inch; printed by the Penitentiary Printing Office.

Boletín Judicial, Bolivar 65; official legal daily; established 1882; 12 to 48 pages, 12 by 18 inches; 72-inch rolls; circulation, 1,800. Foreign subscription price, $5.28 per annum; advertising rates, $0.44 per inch; printed by the Penitentiary Printing Office.

El Imparcial, Esmeralda 349; morning daily; established 1917; 12 pages, 11½ by 16¼ inches; circulation, 5,000. Foreign subscription price, $12 per annum; advertising rates, $0.44 per inch.

El Diario Español, Victoria 661; morning daily, devoted to the interests of the Spanish colony; established 1872; 8 pages, 17½ by 24 inches; 35-inch rolls; circulation, 30,000. Equipment: 24-page Marinoni (French) perfecting press; six Mergenthalers. Foreign subscription price, $24 per annum; advertising rates, $0.44 per inch.

La Verdad, Florida 310; afternoon daily; established July, 1917; 8 to 12 pages, 16 by 22 inches. Foreign subscription price, $8.50 per annum; printed by Sociedad Editorial Argentina.

NEWSPAPERS AND MAGAZINES IN OTHER LANGUAGES, BUENOS AIRES.

ITALIAN.

La Patria degli Italiani, Corrientes 553; morning daily; established 1892; 8 to 12 pages, 18½ by 26 inches; 37-inch rolls; circulation, 40,000. Equipment: Two Marinoni (French) 32-page and one Marinoni 16-page perfecting press; sixteen Mergenthalers; photo-engraving plant. Foreign subscription price, $17.60 per annum; advertising rates, $1.10 to $2.20 per inch (see advertising rate card, exhibit No. 17).

Giornale d'Italia, Lavalle 385; morning daily; established 1908; 8 to 12 pages, 15 by 22 inches; 30-inch rolls; circulation, 25,000. Equipment: Marinoni (French) 24-page perfecting press; nine Mergenthalers. Foreign subscription price, $17.60 per annum; advertising rates, $1.10 per inch.

Il Roma, San Martin 414; afternoon daily; established 1913; 6 to 8 pages, 16 by 23 inches; 16 and 32 inch rolls; circulation, 12,000. Foreign subscription price, $10.56 per annum; advertising rates, $1.10 to $1.30 per inch (see rate card, exhibit No. 17); printed by De Martino & Gutierrez.

La Grande Italia, Rivadavia 655; afternoon daily; established 1917; 4 pages, 16 by 23 inches; 32-inch rolls; circulation, 6,000. Foreign subscription price, $14 per annum; advertising rates, $0.55 per inch.

FRENCH.

Le Courrier de la Plata, Corrientes 549; morning daily; established 1865; 8 pages, 16 by 23 inches; 32-inch rolls; circulation, 5,000. Foreign subscription price, $18 per annum; advertising rates, $1.10 to $2.70 per inch; printed by La Patria degli Italiani.

La Acción Francesa, Reconquista 446; triweekly; established 1915; 4 to 8 pages, 16 by 23 inches; circulation, 5,000. Foreign subscription price, $10 per annum; advertising rates, $0.55 per inch.

ENGLISH.

The Standard, Rivadavia 835; morning daily; established 1860; 8 to 16 pages, 16 by 23 inches; 32-inch rolls; circulation, 5,500. Equipment: R. Hoe & Co. 24-page perfecting press; eight Mergenthalers. Foreign subscription price, $19.44 per annum; advertising rates, $1.44 per inch (see advertising rate card, exhibit No. 17).

Buenos Aires Herald, Corrientes 670; morning daily; established 1880; 12 pages, 17½ by 22½ inches; 35 and 70 inch rolls; circulation, 4,500. Equipment: Duplex 12-page flat-bed perfecting press; seven Mergenthalers. Foreign subscription price, $16.32 per annum; advertising rates, $0.72 per inch.

The River Plate Observer, Corrientes 670; weekly edition of the Buenos Aires Herald; established 1917; 40 pages, 10¾ by 14¾ inches; circulation, 1,250. Foreign subscription price, $7.98 per annum; advertising rates, $0.55 per inch.

The Review of the River Plate, Bartolomé Mitre 427; weekly commercial journal; 60 pages, 8½ by 11 inches; circulation, 2,000. Foreign subscription price, $8.51 per annum; advertising rates, $12.50 to $15 per page (see rate card, exhibit No. 17); printed by the Southern Cross.

The Hibernian Argentine Review, Sarmiento 2002; weekly; established 1906; 32 pages, 9 by 13¾ inches; circulation, 3,700. Equipment: Babcock Optimus press; Babcock drum cylinder; Brehmer (German) folding machine; Brehmer stitching machine; Krause (German) cutting machine; two German Typographs. Foreign subscription price, $4.86 per annum; advertising rates, $66 per page per month.

The Southern Cross, Medrano 107; weekly; established 1874; 24 pages, 11 by 15½ inches; circulation, 3,500. Equipment: Two Mergenthalers; cylinder press. Foreign subscription price, $5 per annum; advertising rates, $25.50 per page.

The British Magazine, Cangallo 536; monthly magazine published by the British Society in the Argentine Republic; established 1916; 44 pages, 6 by 9 inches; circulation, 1,000. Sent free to all members of the society; advertising rates, $10 per page.

The Times of Argentina, 25 de Mayo 214; weekly shipping journal, 36 pages, 9 by 12¼ inches; circulation, 2,000. Foreign subscription price, $7.25 per annum; advertising rates, $89.25 per page per month.

GERMAN.

Deutsche La Plata Zeitung, Sarmiento 648; morning daily; established 1868; 10 to 12 pages, 15½ by 22½ inches; 31-inch rolls; circulation, 8,000. Equipment: Perfecting press; nine Mergenthalers. Foreign subscription price, $15.60 per annum; advertising rates, $0.76 per inch.

Argentinisches Tageblatt, Tucuman 309; morning daily; established 1888; 8 pages, 16 by 23 inches; circulation, 3,000. Equipment: Augsburg (German) cylinder press. Foreign subscription price, $12.50 per annum; advertising rates, $0.44 per inch.

OTHER LANGUAGES.

Assalam, Reconquista 866; afternoon daily in Syrian; 4 pages, 16½ by 24½ inches; circulation, 1,500. Equipment: Marinoni (French) cylinder press. Foreign subscription price, $7 per annum.

La Rusia Libre, Bartolome Mitre 334; semiweekly in Russian; established 1917; 8 pages, 16¼ by 23 inches; circulation, 3,000. Foreign subscription price, $3 per annum.

Nuevo Mundo, Falucho 1160; weekly in Russian; established 1916; 8 pages, 17½ by 25 inches; circulation, 3,000. Foreign subscription price, $3 per annum.

La Bandera Otomana, Charcas 433; weekly in Arabic and Spanish, devoted to the interests of the Turkish colony; 8 pages, 12½ by 18 inches; circulation, 1,000. Foreign subscription price, $3 per annum.

PRINCIPAL WEEKLY AND MONTHLY PUBLICATIONS, BUENOS AIRES.

Caras y Caretas, Chacabuco 151–5; illustrated weekly; established 1897; 100 to 120 pages, 7 by 10½ inches, printed on halftone news and coated book; circulation, 90,000. Foreign subscription price, $8 per annum; advertising rates, quarter page $46.32 to $67.55, half page $106.15 to $127.38, full page $159.22 to $191.07 (see advertising rate card, exhibit No. 17); printed by Caras y Caretas S. A..

Mundo Argentino, Chacabuco 685; illustrated weekly; established 1910; 24 pages, 10½ by 14¼ inches, printed on halftone news and coated book; circulation, 115.000. Foreign subscription price, $3 per annum; advertising rates, $6.05 to $8.60 per inch to $396 per page (see advertising rate card, exhibit No. 17); printed by Suc. de Ricardo Radaelli.

El Hogar, Chacabuco 677; illustrated weekly; established 1904; 48 to 60 pages, 10½ by 14¼ inches, printed on halftone news and coated book; circulation, 55,000. Foreign subscription price, $3 per annum; advertising rates, $6.45 to $8.60 per inch (see advertising rate card, exhibit No. 17); printed by Suc. de Ricardo Radaelli.

P. B. T., Chile 263; illustrated weekly; established 1903; 60 to 72 pages, 8 by 11 inches, printed on machine finish and coated book; circulation, 50,000; foreign subscription price, $8 per annum; advertising rates $106.25 per page (see advertising rate card, exhibit No. 17); printed by Cia. Sud-Americana de Billetes de Banco.

Fray Mocho, Bolivar 586; illustrated weekly; established 1911; 24 pages, 10½ by 14¼ inches; circulation, 50,000. Foreign subscription price, $8 per annum; advertising rates, $4.30 per inch to $157.25 per page (see advertising rate card, exhibit No 17); printed by Suc. de Ricardo Radaelli.

Tit-Bits, Avenida de Mayo 662; sensational illustrated weekly; established 1909; 20 pages, 10½ by 13¾ inches, printed on news; circulation, 80,000. Foreign subscription price, $3.08 per annum; advertising rates, $3.75 to $6.45 per inch (see advertising rate card, exhibit No. 17); printed by El Diario.

Los Sucesos, Rivadavia 649; sensational illustrated weekly; established 1916; 20 pages, 11½ by 15½ inches, printed on news; circulation, 20,000. Foreign subscription price, $2.50 per annum; advertising rates, $0.75 to $0.88 per inch (see advertising rate card, exhibit No. 17); printed by Sociedad Editorial Argentina.

Máscara Dura, Bartolomé Mitre 782; illustrated weekly; established 1917; 16 pages, 10¾ by 14½ inches, printed on halftone news; circulation, 50,000. Foreign subscription price, $3 per annum; advertising rates, $3.30 per inch; printed by Mariani, Rieu & Rossi.

Vida Porteña, Rivadavia 631; illustrated weekly; established 1912; 16 pages, 11¼ by 16 inches, printed on halftone news; circulation, 80,000. Foreign subscription price, $3 per annum; advertising rates, $5.37 per inch (see advertising rate card, exhibit No. 17); printed by José Tragant.

Revista del Plata, Perú 69; illustrated weekly; established 1916; 20 pages, 10¾ by 14½ inches, printed on machine finish and coated book; circulation, 18,000. Foreign subscription price, $5 per annum; advertising rates, $44 to $88 per page.

Vida Española, Talcahuano 90; illustrated weekly; established 1917; 24 pages, 10½ by 14¼ inches, printed on halftone news and coated book; circulation, 25,000. Foreign subscription price $3 per annum; advertising rates, $5.37 to $7.54 per inch (see advertising rate card, exhibit No. 17); printed by L. J. Rosso & Co.

Alma Latina, Casilla del Correo 735; weekly devoted to the interests of the Entente Allies; established 1917; 24 pages, 9¼ by 12½ inches, printed on coated book; circulation, 5,000. Advertising rates, $25 per page.

Correo Musical Sud-Americano, San José 256; weekly devoted to music; established 1915; 24 pages, 10¾ by 14¼ inches, printed on machine finish; circulation, 5,000. Foreign subscription price, $4 per annum; advertising rates, $40 per page.

El Domingo, Corrientes 3431; weekly devoted to sports; established 1916; 20 pages, 8 by 11 inches, printed on machine-finish book; circulation, 4,000; foreign subscription price, $5 per annum; advertising rates, $25 per page; printed by Wiebeck, Turtl & Co.

El Duende, Talcahuano 428; illustrated weekly; established 1917; 16 pages, 11 by 15 inches; circulation, 10,000; foreign subscription price, $2.50 per annum; advertising rates, $1.10 per inch.

Nuevo Tiempo, 25 de Mayo 175; literary semimonthly; established 1916; 28 pages, 7 by 10½ inches, printed on machine-finish book; circulation, 2,500. Foreign subscription price, $3 per annum; advertising rates, $25 per page.

Revista de Economía y Finanzas, Avenida de Mayo 760; commercial bimonthly; established 1911; 24 pages, 8½ by 12 inches, printed on M. F. book; circulation, 5,000; foreign subscription price, $8 per annum; advertising rates, $40 per page, per month.

La Argentina Econ6mica, Bolsa de Comercio; commercial bimonthly; established 1911; 20 pages, 11½ by 15¾ inches, printed on S. & S. C.; circulation, 5,000; foreign subscription price, $8.80 per annum; advertising rates, $50 per page, per month.

Suevia, Alsina 890; illustrated bimonthly; established 1917; 20 pages, 9¼ by 12¼ inches; printed on coated book; circulation, 2,000; foreign subscription price, $2.50 per annum; advertising rates, $20 per page per month; printed by Casa Peuser.

Comentarios, Florida 32; literary bimonthly; established 1916; 24 pages, 9¼ by 12½ inches, printed on S. & S. C.; circulation, 2,000; foreign subscription price, $2 per annum; no advertising.

Revista Nacional, Membrillar 253; literary bimonthly; established 1917; 16 pages, 10½ by 14 inches, printed on M. F.; circulation 3,000; foreign subscription price, $3 per annum; advertising rates, $25 per page.

Irigoyen Luna, Belgrano 3981; illustrated bimonthly; established 1917; 16 pages, 10¾ by 14½ inches, printed on M. F.; circulation, 4,000; subscription price, $2 per annum; advertising rates, $10 per page.

La Palestra, Independencia 2209; bimonthly; established 1917; 20 pages, 7 by 10 inches, printed on news; circulation, 4,000; subscription price, $2 per annum; advertising rates, $11 per page.

La Nota, Florida 529; literary weekly; established 1915; 28 pages and cover, 8¼ by 12¼ inches, printed on S. & S. C.; circulation, 10,000. Foreign subscription price, $10 per annum; advertising rates, $66 per page; printed by Rodriguez Giles.

La Gaceta de España, Chacabuco 186; weekly dedicated to the Spanish colony; 6 to 8 pages, 15¾ by 23 inches; circulation, 15,000. Foreign subscription price, $2.65 per annum; advertising rates, $0.40 to $0.50 per inch.

España Nueva, Rivadavia 655; semiweekly dedicated to the Spanish colony; established 1917; 6 pages, 16 by 23 inches; 48-inch rolls; circulation, 6,000. Foreign subscription price, $7.92 per annum; advertising rates, $0.22 to $0.44 per inch (see advertising rate card, exhibit No. 17); printed by Sociedad Editorial Argentina.

El Resumen, Lavalle 341; commercial weekly; established 1917; 32 pages, 9 by 12½ inches, printed on coated book; circulation, 5,000. Foreign subscription price, $5 per annum; advertising rates, $100 per page per month (see advertising rate card, exhibit No. 17); printed by L. J. Rosso & Co.

Arquitectura, Florida 440; semimonthly magazine for engineers and architects; 32 pages, 9¼ by 12½ inches, printed on S. & S. C.; circulation, 1,500. Foreign subscription price, $8 per annum; advertising rates, $17 per page (see advertising rate card, exhibit No. 17).

La Ingeniería, Maipú 62; engineering semimonthly; published by the Centro Nacional de Ingenieros; established 1895; 76 pages, 7 by 10½ inches, printed on S. & S. C.; circulation, 3,500; foreign subscription price, $7 per annum; advertising rates, $40 per page per month (see advertising rate card, exhibit No. 17).

Revista Técnica Ingeniería, Florida 440; semimonthly technical magazine; established 1895; 32 pages, 9¼ by 12½ inches, printed on S. & S. C.; circulation, 1,500. Foreign subscription price, $8 per annum; advertising rates, $17 per page per month (see advertising rate card, exhibit No. 17); printed by Kidd & Co.

Lloyd Argentino, Reconquista 488; semimonthly magazine devoted to shipping interests; established 1893; 16 pages, 7¼ by 10¾ inches; circulation, 3,000. Foreign subscription price, $6 per annum; advertising rates, $17 per page per month.

Gaceta Rural, Chacabuco 145; monthly, devoted to agricultural and stock-raising interests; established 1907; 48 pages, 9 by 12¼ inches; circulation, 5,000. Advertising rates, $50 per page per month (see advertising rate card, exhibit No. 17).

Anales de la Sociedad Científica Argentina, Cangallo 269; monthly scientific magazine; established 1860; 100 to 112 pages, 7 by 10 inches, printed on S. & S. C.; circulation, 1,000. Foreign subscription price, $5.28; no advertising.

Boletín de la Camara Oficial Española, Chacabuco 869; monthly bulletin of the Spanish Chamber of Commerce; established 1915; 24 pages, 7 by 11 inches, printed on machine finish; circulation, 1,000. Distributed free to members of the chamber; advertising rates, $10 per page.

Boletín Oficial de la Bolsa de Comercio, 25 de Mayo 305; weekly bulletin of the Chamber of Commerce; established 1904; 36 pages, 7 by 10½ inches, printed on S. & S. C.; circulation, 5,000. Distributed free to members of the chamber; advertising rates, $12 per page; printed by Damiano.

Boletín de la Sociedad Tipográfica Bonaerense, San Juan 3244; monthly journal of the Bonaerense Typographical Society; established 1901; 16 pages, 7½ by 10½ inches, printed on antique book; circulation, 5,000. Distributed free to members of the society; advertising rates, $14 per page; printed by Compañía Sud-Americana de Billetes de Banco.

El Magazine, Casilla del Correo 107; monthly magazine; established 1911; 56 pages, 9¼ by 12½ inches, printed on coated book. (This publication suspended in January, 1917, and resumed publication August 1, 1917.)

The River Plate Cement Armado, Reconquista 658; monthly magazine devoted to cement construction; established 1913; 24 pages, 8¼ by 10¼ inches, printed on coated book; circulation, 1,000. Foreign subscription price, $2 per annum; advertising rates, $10 per page.

Revista del Centro Estudiantes de Ingeniería, Peru 222; monthly magazine of students of engineering; established 1900; 100 pages, 7 by 10¼ inches, printed on S. & S. C.; circulation, 1,000. Foreign subscription price, $2 per annum; advertising rates, $15 per page; printed by R. Radaelli.

Revista del Circulo Médico Argentino, Corrientes 2038; monthly medical journal; established 1900; 138 pages, 7½ by 12 inches, printed on machine finish; circulation, 2,000. Foreign subscription price, $2 per annum; advertising rates, $12.32 to $15.40 per page; printed by R. Giles.

Revista Mensual del Museo Social Argentino; monthly sociological journal; established 1910; 64 pages, 7 by 11 inches, printed on S. & S. C.; circulation, 1,000. Foreign subscription price, $2 per annum; advertising rates, $10 per page; printed by Belou, Tripaglia & Borzone.

Boletín de la Unión Industrial Argentina, Cangallo 2461; monthly industrial magazine; 62 pages, 7 by 11 inches; circulation, 5,000.

La Industria de Cueros y Calzado, Bolivar 256; monthly magazine devoted to shoe and leather industry; established 1902; 48 pages, 9 by 12¼ inches; circulation, 3,000. Foreign subscription price, $3.50 per annum; advertising rates, $19.13 per page.

Revista Ilustrada de la Zapatería, Esmeralda 384; monthly magazine devoted to the shoe and leather industry; established 1900; 42 pages, 8½ by 12¼ inches; circulation, 3,000. Foreign subscription price, $3 per annum; advertising rates, $19.13 per page.

Boletín de la Asociación Argentina Electro-Técnicos, Paseo Colon 185, VII; monthly bulletin of Society of Electrical Engineers; established 1915; 32 pages, 6¼ by 9¼ inches; circulation, 1,000. Delivered free to members of society; advertising rates, $10 per page.

El Auto Argentino, Talcahuano 1074; monthly magazine devoted to automobilists; established 1912; 64 pages, 9 by 13 inches; circulation, 5,000. Foreign subscription price, $3 per annum.

Revista del Impuesto Unico; Avenida de Mayo 1297; single-tax monthly; established 1910; 32 pages, 8½ by 11 inches.

El Calzado en la Republica Argentina, Rivadavia 2721; monthly magazine devoted to shoe and leather industry; established 1917; 60 pages, 9 by 12¼ inches.

La Gaceta Estudantil, Avenida de Mayo 650; weekly devoted to the interests of students; established 1917; 4 pages, 16 by 25 inches, printed on news; local subscription price, $0.44 per annum.

El Universitario, Triunvirato 166; weekly devoted to university students; established 1915; 4 pages, 14¼ by 20½ inches, printed on news; local subscription price, $0.44 per annum.

El Ferroviario, Libertad 6453; semimonthly devoted to the interests of the National Railway Association; established 1916; 4 pages, 13½ by 19 inches. Local subscription price, $0.88 per annum.

El Fiscal, Candelaria 200; weekly devoted to the interests of the residents of Vélez Sarsfield (suburb of Buenos Aires); established 1913; 6 pages, 14¼ by 20½ inches.

La Voz del Norte, Araoz 1547; weekly devoted to the interests of the residents in the northern section of Buenos Aires; established 1904; 16 pages, 11½ by 16 inches. Foreign subscription price, $3 per annum; advertising rates, $1.10 per inch.

La Fraternidad, semimonthly organ of the locomotive engineers and firemen; established 1907; 8 pages, 11 by 14½, printed on news.

El Oeste, Rivadavia 3949; weekly devoted to the interests of the residents in the western section of Buenos Aires; established 1911; 6 pages, 12¼ by 18½ inches. Local subscription price, $1.32 per annum.

La Verdad, Santa Fe 2442; weekly devoted to the interests of employees; established 1917; 4 pages, 16 by 23 inches. Local subscription price, $2.20 per annum.

El Panadero del Oeste, Ramon L. Falcon 2468; weekly, devoted to the interests of master bakers; established 1917; 4 pages, 15 by 22 inches; local subscription price, $5.22 per annum.

La Libertad, Cabildo 2223 (Belgrano); weekly, devoted to the interests of the residents of Belgrano; established 1889; 4 pages, 17½ by 25½ inches; local subscription price, $3.52 per annum.

La Idea, Tandil 2533; weekly, devoted to the interests of the residents of the western part of Buenos Aires; established 1908; foreign subscription price, $2.20 per annum.

La Nacional, Almirante Brown 1081; literary weekly; established 1912; 4 pages, 18¾ by 25½ inches.

Circular Bullrich, San Martin 180; weekly, devoted to stock and agricultural interests; established 1908; 8 pages, 10½ by 14½ inches. Distributed free.

OTHER PUBLICATIONS, BUENOS AIRES.

Actualidades, Belgrano 1566.

A. E. G., Sudamericana, Alsina 434; technical review.

Album Internacional de Football del Centenario, Florida 470.

Alkana, Reconquista 1038.

Almanaque del Mensajero, B. Mitre 475; annual almanac.

Al-Hawi, Charcas 455; Arabic magazine.

Anuario de las Compañías de Seguros de Buenos Aires, Cangallo 460; annual of life-insurance companies.

Anuario Kraft, Cangallo 641; annual directory of city and Provinces.

Anuario Médico Sud Americano, Maipú 450; annual medical review.

Archievos de Higiene, Lavalle 638; medical review.

Argentina Médica, Corrientes 633; medical weekly.

Argentinischer Volksfreund, Paraguay 3901; German review.

Arquitectura y Construcción, B. de Irigoyen 17; architects' and builders' magazine.

Arte y Vestir, Moreno 1978–82.

Boletín de Alquileres, Sarmiento 830.

Boletín de Hacienda, Ministerio de Hacienda; official publication.

Boletín de la Dirección General de Territorios Nacionales, Casa de Gobierno; official publication.

Boletín de la Sociedad Gremial "Mercado de Patatas," Almirante Brown 630.

Boletín de la Sociedad Protectora de Animales Sarmiento, Tucuman 1661.

Boletín del Centro Naval, Córdoba 599; monthly naval review.

Boletín del Centro Dispachantes de Aduana, Moreno 455.

Boletín del Ministerio de Agricultura, Ministerio de Agricultura; official publication.

Boletín de Veterinaria, Agricultura y Ganadería, Carlos Calvo 846 y Sarmiento 385.

Boletín Industrial, Victoria 724.

Boletín Mensual del Museo Social Argentino, Maipu 124.

Boletín Militar, Santa Fe 1463; military review.

Boletín Oficial de la Bolsa de Comercio, Bmé. Mitre 382; weekly magazine of the Chamber of Commerce.

Buenos Aires, Lavalle 1282; weekly.

Buenos Aires Handels-Zeitung, 25 de Mayo 518; German financial weekly.

Casale y Catarcio, Rio Bamba 839; sporting weekly.

Ciencias Económicas, Charcas 1835.

Constancia, Tucumán 1736; weekly review.

De Nuestra Historia, R. Peña 830; historical review.

Ecos Gráficos, Moreno 443; monthly printers' journal.

El Avisador Fluvial, Corrientes 556.

El Bordado Moderno, Salta 529.

El Campo, Sarmiento 412.

El Campo y El Sport, Bolivar 256.

El Centinela de Villa Pueyrredon, Ladines 2640.

El Cerealista, Cangallo 315.

El Comercio Español, Florida 339.

El Diarito, San Juan 1864.

El Eco de Caballito, Hidalgo 326.

El Eco de Galicia, Perú 321.

El Economista Argentino, San Martin 142.

El Eco Vegeteriano del Plata, Quintino Bocayuva 761.

El Ganador, San Martin 450.

El Gastrónomo, Victoria 848.

El Heraldo, Mendoza 2734.

El Imparcial, Vieytes 1365.

El Inventor, San Martin 522.

El Mercurio, Victoria 883.

El Meridiano, Rivadavia 1356.

El Mimí, Balcarce 173.

El Monitor de la Salud, Tucumán 114.
El Municipio, Reconquista 144.
El Obrero Gráfico, Estados Unidos 1056.
El Pensamiento Argentino, Mexico 1130.
El Poblador, Peru 166.
El Progreso, Alsina 1966.
El Progreso, Triunvirato 162.
El Progreso Taquigráfico, Corrientes 2151.
El Propagador Cristano, Victoria 1028.
El Radical, Almirante Brown 1064.
El Semanario, Paraguay 3901.
El Social, Lafuente 67.
El Zoofilo Argentino, Paraguay 1061.
English Address Book, Cangallo 542.
Esnea, Corrientes 3574.
Esperanto Bulteno, Paseo Colon 161.
Evangelisches Gemeindeblatt, Esmeralda 166.
Excelsior, Lima 691; motion-picture weekly.
Frankfurter Zeitung, Sarmiento 415; German review.
Guia C. T., Cangallo 828; guide to streets and trains.
Guia de Belgrano, Cabildo 1953.
Guia Eclesiástica, Rivadavia 437.
Guia Gronométrica, Talcahuano 451.
Guia Peuser, Cangallo 502.
Heraldo de Austrias, Corrientes 3574.
Hipocrates, Quintino Bocayuva 761.
Horizontes, Lavalle 547.
Ilustración Española, Victoria 719.
Industria Penaderil, Sarmiento 2523.
Juventud, Corrientes 3574.
La Argentina, Maipú 220; financial guide.
La Argentina Rural, San Martin 254; annual review of stock raising.
La Aurora, Júnin 976.
La Baskonia, Belgrano 1389.
La Buena Lectura, Reconquista 207.
La Campaña, Sarmiento 643.
La Concordia, Corrientes 3574, Talcahuano 469; weekly publication of cigarette makers.
La Defensa del Comercio y de la Industria, Victoria 658.
La Defensa, Alsina 489.
La Electricidad y La Maquinaria, San Martin 522.
La Escuela Nacional, R. Peña 255; educational journal.
La Estrella del Occidente, Suipacha 732.
La Euskaria, Corrientes 3151.
La Gaceta, Sarmiento 882.
La Idea, Camacua 22.
La Ilustración Argentina, Tucumán 1114.
La Ilustración Sudamericana, Sarmiento 657.
La Información Argentina, Perú 285.
La Lectura, Lavalle 1430.
La Libertad, Cabildo 2262.
La Lucha, Bmé. Mitre 1681–83.
La Odontologia Argentina, Avenida de Mayo 1276: monthly.
La Pampa Argentina, Independencia 1199.
La Patrie Suisse, Corrientes 3574.
La Plata Post, Sarmiento 648; weekly edition of Deutsche Zeitung.
La Prensa Médica Argentina, Cordoba 1877.
La Previsora, San José 756.
La Propiedad, Tucumán 1331.
La Reforma Comercial, Corrientes 435.
La Reina de la Moda, Florida 122; monthly fashion journal.
La Universidad Popular, Avenida de Mayo 715.
La Verdad, Donato Alvarez 2130.
Le Courrier Suisse, Corrientes 3574.
Lectoral Católico, San Carlos 4050.
Le Franco Americain, B. Mitre 343.
Los Diarios, Melo 2790.

Moda Elegante, Victoria 719.
Monitor de Sociedades Anónimas y Patentes de Invención, San Martin 522.
Museo de los Sastres, Victoria 719.
Nosotros, Libertad 543.
Paginas Argentinas, Avenida de Mayo 760.
Paginas de Oro, Cangallo 2105.
Patentes y Marcas, B. Mitre 343.
Promajos, 25 de Mayo 743.
Reacción, Suarez 351.
Republicano Español, Vieytes 1365.
Revista Azucarera, Florida 248.
Revista Almacenera, Chacabuco 325.
Revista Argentina de Ciencias Políticas, Viamonte 1287.
Revista de Ciencias Comerciales, Tucumán 1353.
Revista de Derecho, Historia y Letras, Santa Fe 1206.
Revista de Filosofía, Viamonte 763.
Revista de Bolsa de Cereales, Pueyrredón 190.
Revista del Círculo Médico y Centro Estudiantes de Medicina, Corrientes 2038.
Revista del Hospital del Niños, Gallo 1330.
Revista de la Sociedad Filatélica Argentina, Cangallo 329.
Revista de la Universidad, Viamonte 430.
Revista del Notariado, Avenida de Mayo 776, piso 1.
Revista Financiera y Comercial, 25 de Mayo 518.
Revista Industrial, Lima 1029.
Revista Jurídica de Ciencias Sociales, Lavalle 1394.
Revista Médica Homeopática, Entre Rios 916.
Revista Sportiva, Rio Bamba 839.
Revista Telegráfica, Victoria 202.
Selecta, Cabildo 2262.
Siluetas, Cangallo 2105.
Skandinaven, Corrientes 461.
Territorios Nacionales, Reconquista 349.
Tierras y Colonias, Negoya 3080.
Unión y Labor, Rivadavia 1176.
Veritas Americano, Florida 248.
Viator, B. de Irigoyen 175.

NEWSPAPERS IN ROSARIO.

La Capital, Sarmiento 767; morning daily; established 1867; 12 to 20 pages, 17½ by 26 inches; 17½ and 34½ inch rolls; circulation, 37,000. Equipment: One Marinoni (French) 20-page and one 16-page perfecting press; nine Mergenthalers. Foreign subscription price, $25.50 per annum; advertising rates, $0.50 per inch on advertising pages and $1.12 per inch on pages with reading matter.

El Mensajero, Maipú 863; afternoon daily; established 1882; 8 pages, 14½ by 20½ inches; circulation, 3,500. Equipment: Alauzet (French) double-feed newspaper press; three Mergenthalers. Foreign subscription price, $12.75 per annum; advertising rates, $0.21 per inch on last page with advertisements, $0.32 per inch on second page with advertisements, $0.85 per inch on third page with reading matter.

Crónica, Cordoba 861; afternoon daily; established 1914; 8 pages, 14½ by 21 inches; circulation, 3,500. Equipment: Heidelberg (German) cylinder press; two Mergenthalers. Foreign subscription price, $12.75 per annum; advertising rates, $0.21 per inch on pages with advertisements and $0.42 per inch on pages with reading matter.

La República, Santa Fé 968; morning daily; established 1898; 8 pages, 16 by 22½ inches; circulation, 1,000. Equipment: Marinoni (French) double-feed newspaper press; Mergenthaler. Foreign subscription price, $10.20 per annum; advertising rates, $0.21 per inch on advertising pages.

El Civismo, Cordoba 1143; morning daily; established 1914; 8 pages, 16 by 23 inches; circulation, 1,600. Equipment: Augsburg (German) cylinder press; Canadian linotype. Foreign subscription price, $10.20 per annum; advertising rates, $0.16 per inch for advertising pages and $0.21 per inch for pages with reading matter.

El Figaro, B. Mitre 1051; morning daily; established 1916; 8 pages, 14½ by 20½ inches; circulation, 1,500. Equipment: Augsburg (German) cylinder press; Mergenthaler. Foreign subscription price, $8.50 per annum; advertising rates, $1.06 per inch per month.

El Mercurio, Cordoba 951; weekly; established 1916; 4 pages, 18 by 26 inches; circulation, 1,000. Foreign subscription price, $2.55 per annum; advertising rates, $0.16 per inch.

La Razón, Cordoba 1331; weekly; established 1917; 8 pages, 14¼ by 21 inches; circulation, 1,000. Foreign subscription price, $4.68 per annum; advertising rates, $0.11 per inch.

Other weeklies or monthlies in Rosario: El Deber, El Latigo, Heraldo de España, Sui Generis.

NEWSPAPERS IN LA PLATA.

El Día, Diagonal 80, No. 817–821; morning daily; established 1883; 8 pages, 15¾ by 23½ inches; 31½-inch rolls; circulation, 15,000. Equipment: Marinoni (French) 16-page perfecting newspaper press; five German typographs; photo-engraving plant. Foreign subscription price, $10.56 per annum; advertising rates, $0.33 per inch for pages 2, 5, 6 and 7 and $0.67 for other pages, subject to discount of 20 per cent for contracts.

El Argentino, Calle 49, No. 471; morning daily; established 1906; 6 to 8 pages, 17½ by 24 inches; 17½ and 35 inch rolls; circulation, 6,000. Equipment: Payne & Sons (Otley, England) 8-page flat-bed perfecting press; five German typographs. Foreign subscription price, $10,56 per annum; advertising rates, $0.11 per inch on pages 2 and 5 and $0.16½ per inch on page 4, subject to discount for contracts.

La Provincia, Diagonal 80, No. 929; afternoon daily; established 1916; 8 pages, 16¼ by 23 inches; circulation, 4,000. Equipment: Koenig & Bauer (German) cylinder press; Mergenthaler; German typograph; Eclipse folder. Foreign subscription price, $8.80 per annum; advertising rates, $0.25 per inch to $44 per half page for one month.

Buenos Aires, Calle 51, No. 777; afternoon daily; established 1893; 4 pages, 17¾ by 25½ inches; circulation, 1,800. Equipment: Marinoni (French) cylinder press; two German typographs. Foreign subscription price, $5.28 per annum; advertising rates, $0.11 per inch.

La República, Calle 8, Nos. 961–963; afternoon daily; established 1896; 8 pages, 16½ by 22¾ inches; circulation, 4,000. Equipment: Marinoni (French) cylinder press; Mergenthaler. Foreign subscription price, $20 per annum; advertising rates, $0.27½ per inch for page 1, $0.16½ per inch for pages 4 and 5, and $0.11 per inch for other pages.

La Palabra, Calle 13, No. 845; afternoon daily; established 1913; 4 pages, 16 by 23 inches; circulation, 1,500. Foreign subscription price, $11 per annum; advertising rates, $0.11 per inch.

El Tribuno, Calle 48, No. 688: morning daily; established 1916; 4 pages, 16 by 23 inches; circulation, 1,600. Equipment: Augsburg (German) cylinder press. Foreign subscription price, $10.56 per annum; advertising rates, 8 inches, $15.40 per month.

Los Debates, Calle 12, No. 760; afternoon daily; established 1901; 8 pages, 16 by 23 inches; circulation, 900. Equipment: Marinoni (French) cylinder press. Foreign subscription price, $4.40 per annum; advertising rates, $1.10 per inch per month.

El Heraldo, Calle 48, No. 910; afternoon daily; established 1913; 4 pages, 14¾ by 21½ inches; circulation, 1,000. Equipment: Marinoni (French) cylinder press; C. & P. platen press. Foreign subscription price, $4.40 per annum: advertising rates, $0.11 per inch.

La Acción, Calle 7, No. 1150; afternoon daily; established 1913; 8 pages, 12½ by 17¾ inches; circulation, 1,000. Equipment: Augsburg (German) cylinder press; two German typographs. Foreign subscription price, $4.40 per annum; advertising rates, $0.05½ per inch.

La Tarde, Calle 12, No. 631; afternoon daily; established 1916; 4 pages, 16 by 23 inches; circulation, 1,000. Equipment: Alauzet (French) cylinder press. Foreign subscription price, $7.92 per annum; advertising rates, $0.11 per inch.

Boletín Oficial de la Provincia de Buenos Aires, Calle 50, No. 577; official daily of the provincial government; 16 to 44 pages, 11 by14½ inches; circulation, 1,500. Foreign subscription price, $5.28 per annum; advertising rates, $0.33 per inch.

OTHER PUBLICATIONS IN THE INTERIOR.[1]

Acebal: El Defensor; daily; established 1905; 4 pages, 18 by 25½ inches.
Adolfor Alsina: El Progreso; weekly; established 1910; 4 pages, 16 by 23 inches.
Almirante Brown: El Brown; weekly; established 1906; 4 pages, 14¾ by 21½ inches.
Avellaneda: El Socialista; weekly; established 1909; 4 pages, 14¼ by 20½ inches.
Ayacucho: El Comercio; semiweekly; established 1910; 4 pages, 14¼ by 20½ inches.
Azul: El Imparcial; morning daily; established 1896; 4 pages, 18 by 25½ inches.
El Ciudadano; afternoon daily; established 1907; 4 pages, 18 by 25½ inches.

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[1] Names of cities and towns are in italics.

Balcarce: La Tribuna; weekly; established 1906; 4 pages, 17¾ by 25½ inches.

Bartolome Mitre: La Opinión; weekly; established 1916; 4 pages, 14¾ by 21½ inches.

Bolivar: La Verdad; weekly; established 1912; 8 pages, 12½ by 18 inches.

La Ley; semi-weekly; established 1911; 4 pages, 17¾ by 25 inches.

Bragado: El Censor; semiweekly; established 1908; 4 pages, 16 by 23 inches.

Bahia Blanca: La Nueva Provincia; morning daily; established 1898; 12 to 16 pages, 16 by 23½ inches. Equipment: Augsburg 24-page perfecting press; two Mergenthalers; two Canadian linotypes; photo-engraving plant. Foreign subscription price, $24.60 per annum.

Bahia Blanca; morning daily; established 1905; 8 pages, 16 by 23 inches. Equipment: Augsburg (German) cylinder press; four German typographs; photo-engraving plant.

El Siglo; morning daily; established 1916; 10 pages, 16 by 23 inches.

El Censor; afternoon daily. Equipment: Wormatia (German) cylinder press, two German typographs.

Bella Vista: El Civico; weekly; established 1912; 4 pages, 15 by 20½ inches.

Campaña: El Imparcial; semiweekly; established 1909; 4 pages, 15 by 21½ inches.

Castex: Tribuna Radical; weekly; established 1917; 4 pages, 14¼ by 20½ inches.

Catamarca: El Día; afternoon daily; established 1911; 4 pages, 16½ by 23 inches.

La Ley; triweekly; established 1896; 4 pages, 16½ by 24 inches.

Chacabuco: Chacabuco; semiweekly; established 1911; 4 pages, 19 by 26 inches.

Chascomús: El Cronista; morning daily; established 1915; 4 pages, 17¾ by 25½ inches.

El Argentino; morning daily; established 1886; 4 pages, 17¾ by 25½ inches.

Chivilcoy: La Razón; afternoon daily; established 1911; 4 pages, 17¾ by 25½ inches.

La Democracia; morning daily; established 1885; 4 pages, 20¼ by 28½ inches.

El Tribuno; morning daily; established 1917; 8 pages, 15 by 23 inches.

Chubut: La República; semiweekly; established 1912; 8 pages, 14 by 21 inches.

Comodoro Rivadavia: El Rivadavia; weekly; established 1915; 12 pages, 14¼ by 20½ inches.

Concordia: El Litoral; afternoon daily; established 1900; 4 pages, 22 by 30½ inches.

La Voz del Norte; morning daily; established 1916; 4 pages, 14¼ by 22 inches.

La Provincia; morning daily; established 1917; 4 pages, 16½ by 23 inches.

El Orden; morning daily; established 1916; 4 pages, 14¾ by 22 inches.

Cordoba: Los Principios, Avenida G. Paz 75; morning daily; established 1893; 12 pages, 17¼ by 22 inches. Equipment: Duplex 12-page flat-bed perfecting press; Augsburg cylinder press; Brehmer (German) folding machine; three German platen presses: six German typographs; Canadian linotype; photo-engraving plant. Foreign subscription price, $24 per annum.

La Voz del Interior, 9 de Julio 63; morning daily; established 1903; 10 pages, 17 by 24 inches. Equipment: Flat-bed perfecting press; four Mergenthalers; photo-engraving plant. Foreign subscription price, $24 per annum; advertising rates, $1.07 per inch for one insertion to $3.22 per inch per month (see advertising rate card, exhibit No. 17).

La República, Rivera Indarte 56; morning daily; established 1916; 8 pages, 16 by 23 inches; circulation, 4,500. Equipment: Augsburg cylinder press; photo-engraving plant. Foreign subscription price, $24 per annum; advertising rates, $0.96 per inch for one insertion to $2.14 per inch for one month (see advertising rate card, exhibit No. 17).

La Opinión,Santa Rosa 36: afternoon daily; established 1915; 8 pages, 16 by 23 inches. Equipment: Marinoni (French) cylinder press.

Coronel Pringles: Pringles; weekly; established 1910; 8 pages, 12½ by 17¼ inches.

Corrientes El Liberal; afternoon daily; established 1914; 4 pages, 14½ by 20½ inches.

La Constitución; morning daily; established 1917; 4 pages, 14½ by 20½ inches.

Corrientes; triweekly; established 1910; 4 pages, 16 by 23 inches.

La Libertad; triweekly; established 1890; 4 pages, 14½ by 20 inches.

Boletín Oficial; official daily; established 1910; 4 to 8 pages, 11½ by 16 inches.

La Santisima Cruz de los Milagros; semimonthly; established 1916; 4 pages, 10¼ by 14½ inches.

Curuzu Cuatia: Los Principios; weekly; established 1916; 4 pages, 14¼ by 20½ inches.

Dolores: La Patria; afternoon daily; established 1876; 4 pages, 16 by 23 inches.

Esperanza de Santa Fe: El Colono; semiweekly; established 1910; 4 pages, 16 by 22½ inches.

Galvez: El Popular; weekly; established 1911; 4 pages, 16 by 23 inches.

General Alvear: La Verdad; weekly; established 1915; 8 pages, 11½ by 16 inches.

General Lamadrid: Democracia; weekly; established 1917; 8 pages, 12¼ by 17 inches.

General Madriaga: La Semana; weekly; established 1910; 4 pages, 14¼ by 23 inches.

General Pico: Maraco; semiweekly; established 1915; 4 pages, 14¼ by 20½ inches.

El Combate; semiweekly; established 1916; 4 pages, 14¼ by 20½ inches.

General Pico; semiweekly; established 1912; 4 pages, 14¼ by 20½ inches.

Nuevos Rumbos; semiweekly; established 1912; 4 pages, 14¼ by 20½ inches.

El Derecho; weekly; established 1916; 4 pages, 14¼ by 20½ inches.

General Piran: La Voz de General Piran; weekly; established 1907; 4 pages, 16 by 23 inches.

General Roca: Rio Negro; weekly; established 1911; 4 pages, 14 by 20½ inches.

General Villegas: El Comentario; weekly; established 1914; 6 pages, 18 by 25 inches.

La Verdad; weekly; established 1903; 14 pages, 17¼ by 25 inches.

Gonzales Chavez: La Reacción; semiweekly; established 1907; 4 pages, 16 by 23 inches.

Goya: La Patria; weekly; established 1872; 6 pages, 16½ by 25 inches.

Gualeguay: La Opinión; daily; established 1916; 14½ by 22 inches.

Gualeguaychu: El Censor; afternoon daily; established 1900; 8 pages, 15½ by 23½ inches.

El Argentino; afternoon daily; established 1912; 8 pages, 12½ by 18 inches.

El Noticiero; triweekly; established 1897; 4 pages, 14¼ by 20½ inches.

Los Principios; weekly; established 1889; 4 pages, 14¼ by 20½ inches.

Guamini: El Censor; weekly; established 1911; 4 pages, 14¼ by 20½ inches.

Junin: El Mentor; morning daily; established 1898; 4 pages, 16½ by 22 inches.

Jujuy: El Provincial; afternoon daily; established 1910; 4 pages, 17¼ by 26 inches.

El Dia; afternoon daily; established 1910; 4 pages, 16½ by 26 inches.

Juarez: El Tribuno; weekly; established 1916; 4 pages, 14¼ by 20½ inches.

La Banda: El Figaro; triweekly; established 1913; 4 pages, 14¼ by 20½ inches.

Lanus: La Comuna; weekly; established 1916; 4 pages, 14¼ by 20 inches.

La Rioja: El Independiente; weekly; established 1902; 4 pages, 14¼ by 20½ inches.

Las Flores: Acción Social; weekly; established 1917; 4 pages, 13 by 18½ inches.

Lobos: La Vida; semimonthly; established 1916; 4 pages, 12½ by 18 inches.

Lujan: La Opinión; weekly; established 1912; 4 pages, 14¼ by 21¼ inches.

Macachin: Nueva Época; weekly; established 1916; 4 pages, 12¼ by 18 inches.

Maipu: La Voz; afternoon daily; established 1902; 4 pages, 14¼ by 20½ inches.

La Reacción; weekly; established 1917; 4 pages, 14¼ by 20½ inches.

Mar del Plata: La Capital; morning daily; established 1904; 4 pages, 17¾ by 25½ inches.

Mendoza: Los Andes, Lavalle 94; morning daily; established 1881; 8 to 12 pages, 17 by 26½ inches; 35-inch rolls; circulation, 10,000. Equipment: Hoe 24-page perfecting press; three Mergenthalers. Foreign subscription price, $24.20 per annum; advertising rates, $0.20 to $0.30 per inch.

La Tarde, Calle San Martin; afternoon daily; established 1910; 8 pages, 16 by 23 inches; circulation, 3,000. Equipment: German cylinder press; three Mergenthalers. Foreign subscription price, $24.20 per annum; advertising rates, $0.15 to $0.25 per inch.

La Palabra, Necochea 36-40; afternoon daily; established 1916; 8 pages, 16 by 23 inches; circulation, 3,000. Equipment: Augsburg (German) cylinder press; two German typographs. Foreign subscription price, $24 per annum; advertising rates, $0.15 to $0.20 per inch.

Noticias, Rivadavia 215; morning daily; established 1917; 8 pages, 14½ by 22 inches; circulation, 2,000. Foreign subscription price, $23.50 per annum; advertising rates, $0.15 to $0.20 per inch.

Mercedes de San Luis: El Imparcial; afternoon daily; established 1897; 4 pages, 18 by 26 inches.

La Voz del Sur; daily; established 1902; 4 pages, 17½ by 25 inches.

Mercedes: El Orden; triweekly; established 1894; 4 pages, 21 by 29½ inches.

La Provincia; established 1909.

Mercedes (*Corrientes*): La Razón; weekly; established 1898; 4 pages, 16 by 22½ inches.

Mar Chiquita (*Coronel Vidal*): El Pueblo; weekly; established 1901; 4 pages, 16 by 23 inches.

Monte Caseros: Voz Casareña; weekly; established 1916; 4 pages, 14¼ by 20½ inches.

Necochea: Necochea; afternoon daily; established 1909; 4 pages, 16 by 23 inches.

Neuquen: Neuquen; afternoon daily; established 1909; 4 pages, 17 by 24½ inches.

Nueva Era; afternoon daily; established 1917; 4 pages, 14¼ by 20½ inches.

Nueve de Julio: El Porvenir; weekly; established 1894; 4 pages, 16 by 23 inches.

El Luchador; semiweekly; established 1903; 4 pages, 16 by 25 inches.

El 9 de Julio; semiweekly; established 1908; 8 pages, 10¼ by 14½ inches.

Olavarria: El Popular; triweekly; established 1895; 8 pages, 16 by 23 inches.

La Democracia; triweekly; established 1901; 8 pages, 14 by 20 inches.

Olivos: La Unión; weekly; established 1911; 8 pages, 11½ by 16 inches.

Parana: El Diario; morning daily; established 1913; 8 pages, 14½ by 23 inches. Equipment: One Mergenthaler.

La Acción; morning daily; established 1911; 4 pages, 16 by 23 inches.

El Entre-Rios; afternoon daily; established 1894; 6 pages, 14 by 20½ inches.

El Democrata; afternoon daily; established 1917; 4 pages, 14¼ by 20½ inches.

Boletín Oficial; official weekly; established 1913; 8 to 24 pages, 10½ by 14¼ inches. Equipment: One Mergenthaler.

Pehuajo: La Unión; afternoon daily; established 1905; 4 pages, 18½ by 28½ inches.

Pergamino: La Época; morning daily; established 1906; 4 pages, 17½ by 25½ inches.

El Pueblo; morning daily; established 1908; 6 pages, 14¼ by 20½ inches.

Posadas: El Eco de Misiones; weekly; established 1902; 4 pages, 14¼ by 20½ inches.

El Radical; afternoon daily; established 1913; 4 pages, 16 by 23 inches.

El Pueblo; morning daily; established 1904; 4 pages, 16½ by 24 inches.

Puerto Deseado: El Sur; weekly; established 1913; 8 pages, 12 by 17 inches.

Puerto Madryn: Golfo Nuevo; weekly; established 1913; 4 pages, 12½ by 18½ inches.

Puerto Santa Cruz: La Capital; weekly; established 1917; 4 pages, 12¼ by 17 inches.

Punta Alta: Nueva Época; weekly; established 1907; 4 pages, 14¼ by 20½ inches.

Rafaela: El Liberal; weekly; established 1893; 8 pages, 16 by 23 inches.

La Patria; weekly; established 1909; 8 pages, 16 by 23 inches.

Resistencia: La Voz de Chaco; afternoon daily; established 1916; 4 pages, 16 by 23 inches.

El Colono; weekly; established 1904; 4 pages, 16 by 23 inches.

El Constitucional; weekly; established 1914; 4 pages, 14¼ by 20½ inches.

Nueva Era; weekly; established 1916; 4 pages, 14¼ by 20½ inches.

Heraldo Chaqueño; semiweekly; established 1917; 4 pages, 14¼ by 20½ inches.

Rio Cuarto: El Orden; morning daily; established 1907; 4 pages, 16 by 23 inches.

El Pueblo; morning daily; established 1912; 4 pages, 14¼ by 20½ inches.

El Imparcial; afternoon daily; established 1917; 4 pages, 14¼ by 20½ inches.

Rioja: El Independiente; weekly; established 1902; 4 pages, 14¼ by 20½ inches.

La Verdad; weekly; established 1917; 4 pages, 15 by 22 inches.

Rio Gallegos: La Opinión Española; weekly; established 1917; 4 pages, 17¾ by 25 inches.

La Unión; weekly; established 1906; 8 pages, 14½ by 20½ inches.

Rojas: El Orden; weekly; established 1916; 4 pages, 10¼ by 14½ inches.

Saladillo: El Argentino; weekly; established 1909; 4 pages, 17½ by 25 inches.

La Semana; weekly; established 1912; 8 pages, 11½ by 15¾ inches.

Saliquelo: El Progreso; weekly; established 1916; 4 pages, 14 by 20½ inches.

Salta: El Cívico; morning daily; established 1890; 4 pages, 17¾ by 25 inches.

La Libertad; morning daily; established 1916; 4 pages, 17¾ by 25 inches.

La Provincia, morning daily; established 1907; 8 pages, 14¼ by 20½ inches.

Tribuna Popular; morning daily; established 1905; 4 pages, 20½ by 28½ inches.

San Isidro: La Libertad; weekly; established 1917; 4 pages, 13¼ by 19½ inches.

Boletín Municipal, semimonthly; established 1913; 4 pages, 10 by 15½ inches.

San Juan: Debates; afternoon daily; established 1911; 6 pages, 15¾ by 22½ inches.

El Povenir; morning daily; established 1898; 8 pages, 16½ by 23 inches. Equipment: One Mergenthaler.

San Juan; afternoon daily; established 1909; 8 pages, 16 by 23 inches.

Diario Nuevo; daily; established 1916; 6 pages, 16 by 23 inches.

San Francisco: La Voz de San Justo; weekly; established 1915; 14½ by 21½ inches.

San Luis: La Provincia; afternoon daily; established 1905; 4 pages, 16 by 23 inches.

La Reforma; semiweekly; established 1892; 4 pages, 16 by 23 inches.

La Opinión; afternoon daily; established 1912; 4 pages, 15¾ by 22½ inches, Equipment: One Mergenthaler.

San Nicolas: El Noticiero; afternoon daily; established 1895; 4 pages, 17½ by 25 inches.

San Pedro: Sarmiento; weekly; established 1916; 4 pages, 10¼ by 14½ inches.

San Pedro de Jujuy: El Eco; weekly; 4 pages, 14½ by 22 inches.

Santa Fe: Santa Fe; morning daily; established 1910; 8 to 12 pages, 16 by 22 inches; 32-inch rolls; circulation, 6,000. Equipment: Flat-bed perfecting newspaper press; two Mergenthalers; four German typographs. Foreign subscription price, $20 per annum.

Nueva Época; morning daily; established 1885; 8 pages, 16 by 23 inches; circulation, 5,000. Equipment: Two Marinoni (French) cylinder presses; two German typographs. Foreign subscription price, $20 per annum; advertising rates, $0.14 to $0.30 per inch.

La Palabra; afternoon daily; established 1916; 8 pages, 16 by 23 inches.

El Imparcial; weekly; established 1913; 4 pages, 14¼ by 20½ inches.

Santa Rosa: La Capital; morning daily; established 1895; 4 pages, 16 by 23 inches.

Tribuna; weekly; established 1917; 4 pages, 14¼ by 20½ inches.

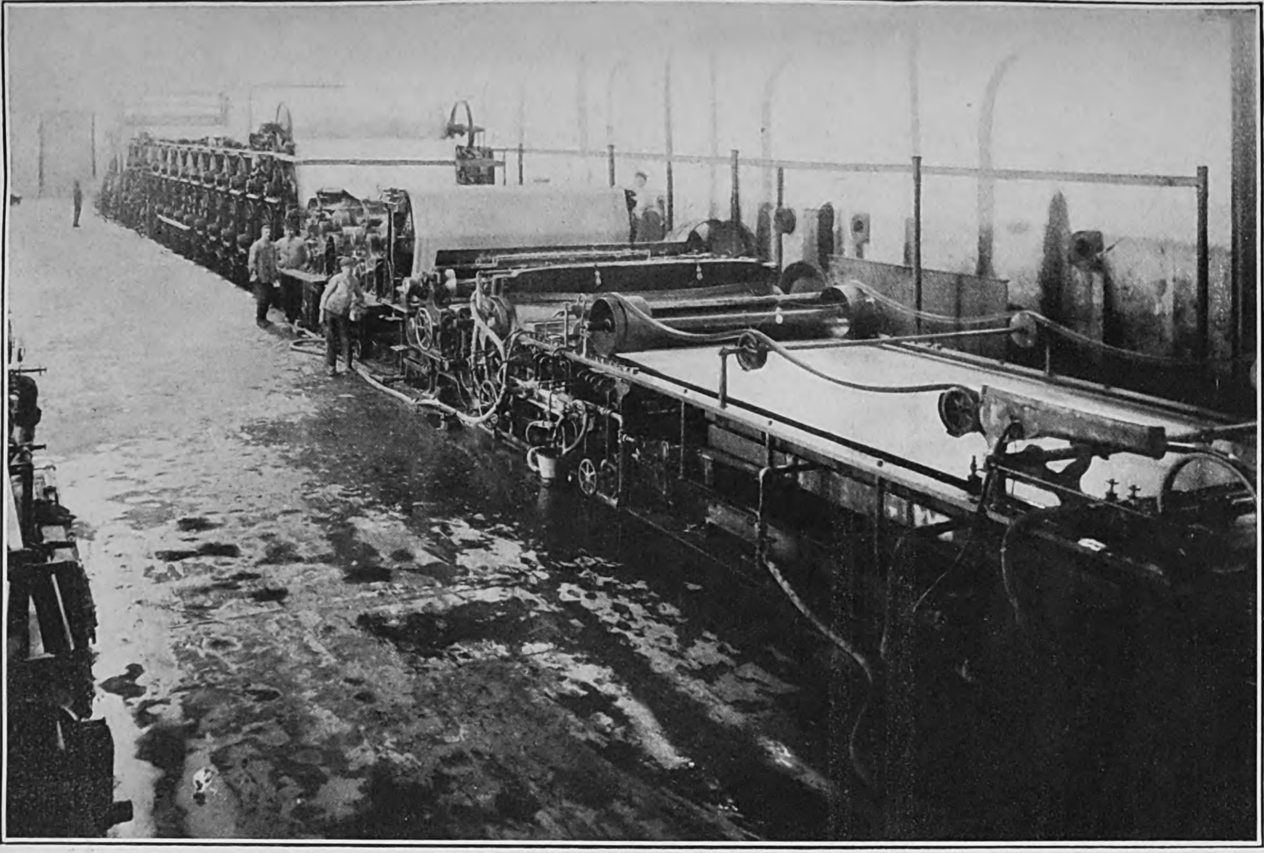

FIG. 10.—FOURDRINIER MACHINES IN PAPER MILL OF COMPAÑÍA GENERAL DE FÓSFOROS AT BERNAL, ARGENTINA.

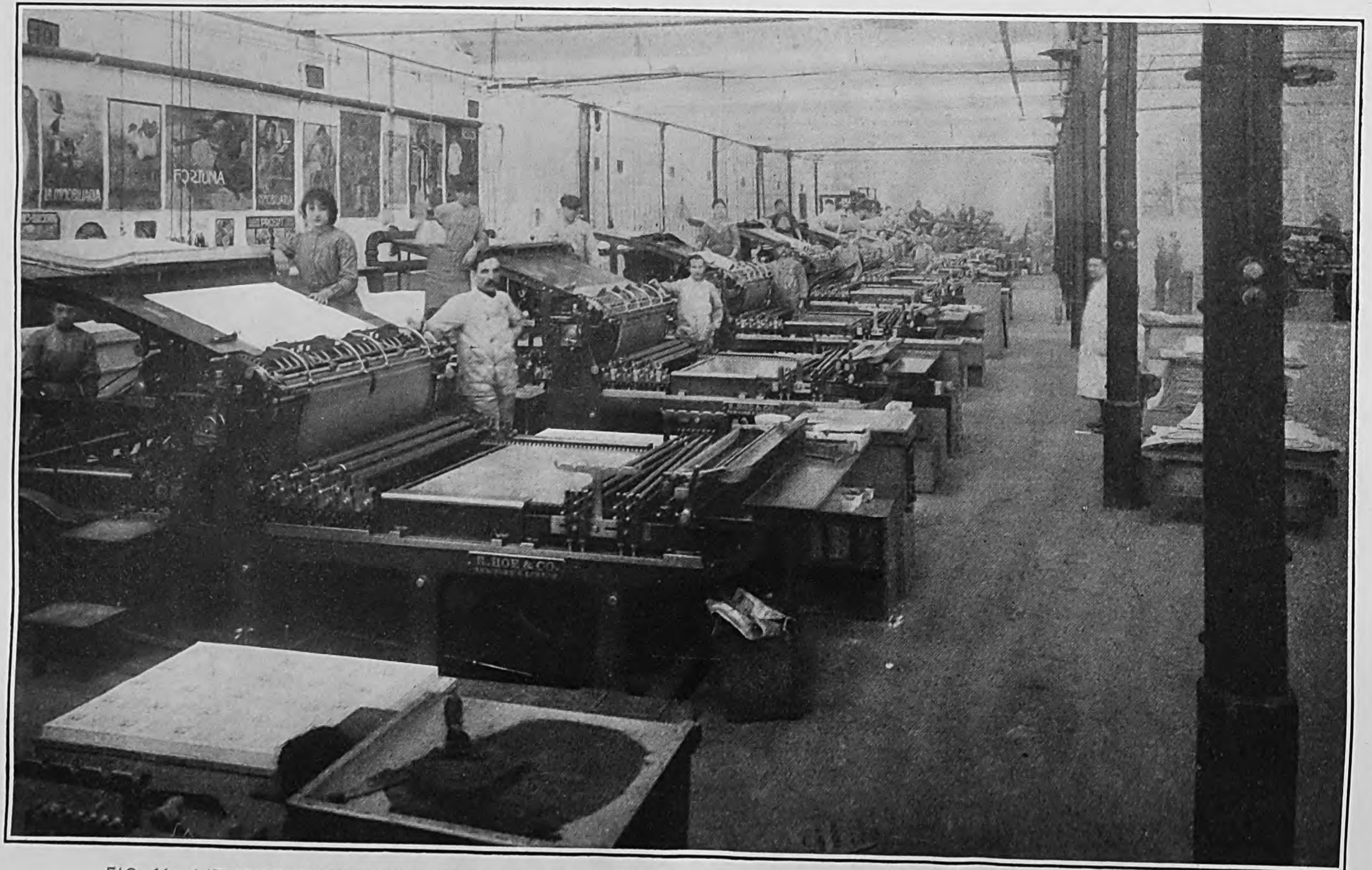

FIG. 11.—LITHOGRAPHING PRESSES IN BUENOS AIRES PRINTING PLANT OF COMPAÑIA GENERAL DE FÓSFOROS.

La Autonomía; afternoon daily; established 1908; 4 pages, 14½ by 21½ inches.

Santiago del Estero: El Siglo; afternoon daily; established 1900; 4 pages, 23 by 32 inches.

El Liberal; afternoon daily; established 1898; 8 pages, 16 by 23 inches.

Tandil: El Restituyente; semiweekly; established 1915; 4 pages, 16 by 23 inches.

Trelew: El Pueblo; weekly; established 1917; 4 pages, 14¼ by 20½ inches.

Trenque-Lauquen: El Independiente; weekly; established 1898; 4 pages, 16 by 23 inches.

El Cívico; semiweekly; established 1912; 4 pages, 14¼ by 20¾ inches.

Tres Arroyos: La Palabra; morning daily; established 1917; 4 pages, 14¼ by 20½ inches.

La Razón; afternoon daily; established 1912; 6 pages, 16 by 23 inches.

Tucuman: El Orden; afternoon daily; established 1881; 8 pages, 17½ by 25 inches. Equipment: Marinoni (French) perfecting newspaper press; three Mergenthalers. Foreign subscription price, $16.72 per annum;

La Gaceta; morning daily; established 1912; 8 pages, 17½ by 25 inches. Equipment: Duplex (Swiss) flat-bed perfecting press; three Mergenthalers. Foreign subscription price, $16 per annum.

La Patria; morning daily; established 1917; 8 pages, 14¾ by 22 inches.

La Voz del Pueblo; weekly; established 1917; 4 pages, 14½ by 21¼ inches.

Uruguay: Evolución; afternoon daily; established 1907; 4 pages, 14¼ by 20½ inches.

Democracia; triweekly; established 1916; 4 pages, 14¼ by 20½ inches.

La Juventud; triweekly; established 1896; 4 pages, 16 by 23 inches.

Urdinarrain: Urdinarrain; weekly; established 1909; 4 pages, 16 by 23 inches.

Victoria: El Aura; weekly; established 1913; 4 pages, 14¼ by 20½ inches.

La Coalición; triweekly; established 1900; 4 pages, 16 by 23 inches.

La Tarde; afternoon daily; established 1916; 4 pages, 16 by 23 inches.

La Prensa Libre; semiweekly; established 1907; 4 pages, 16 by 23 inches.

Victorica: El Heraldo; weekly; established 1908; 4 pages, 14¼ by 20½ inches.

Viedma: Flores del Campo; daily; established 1902: 4 pages, 14¼ by 20¼ inches.

La Nueva Era; weekly; established 1902; 4 pages, 16½ by 25 inches.

Viente Cinco de Mayo: El Imparcial; weekly; established 1895; 4 pages, 17¾ by 25 inches.

Villa Dolores: El Debate; semiweekly; established 1917; 4 pages, 14¼ by 20½ inches.

Villaguay: La Razon; semiweekly; established 1910; 4 pages, 14¼ by 20½ inches.

Villa Maria: Tercero Abajo; weekly; established 1906; 4 pages, 16 by 23 inches.

El Heraldo; weekly; established 1916; 4 pages, 16 by 23 inches.

Villa Mercedes: Diario Moderno; daily; established 1917; 4 pages, 16½ by 25 inches.

LEADING PRINTERS AND LITHOGRAPHERS, BUENOS AIRES.

Compañía General de Fósforos, main office Lima 239, works California 2600, paper mill Bernal, printing and lithographing plant also at Montevideo, Uruguay; manufacturers of matches, paper, printing, lithographing, paper boxes, blank books, playing cards, photo-engravers, importers of paper; established 1889. Equipment: Two G. Mann (English) offset presses; Aluminum Co. rotary zinc press; twelve R. Hoe & Co. stone lithographing presses; Walter Scott stone lithographing press; five Miehle cylinders; two Huber cylinders; L. & M. (English) cylinder; twelve German and French cylinders (Schelter & Giesecke, Augsburg, Koenig & Bauer, and Marinoni); Kidder automatic press; seven Dexter and four German automatic feeders; fourteen platen presses (Victoria, John Thompson, and Haddons); eight Seybold cutting machines; two Payne & Son (English) cutting machines; Krause (German) continuous magazine trimming machine; six Förste & Tromm (German) disk ruling machines; three pen ruling machines; five Brehmer (German) book-sewing machines; eight Brehmer (German) folding machines; twenty Brehmer (German) stitching machines; two Marinoni (French) varnishing machines; Krause (German) die-stamping and gilding machines; three monotypes; Mergenthaler lead-casting machine; photo-engraving and electrotyping plants, equipped with R. Hoe & Co. machinery; 900 employees.

Guillermo Kraft, Cangallo 641; printer, lithographer, manufacturer of blank books, publisher of directories, importer of paper; established 1864; plant destroyed by fire on June 6, 1917, causing a damage of several hundred thousand dollars; when this report was written, August, 1917, plant was being rebuilt. Equipment before the fire consisted of two rotary perfecting magazine presses; four rotary offset presses; from 60 to 75 lithographing and book presses, most of which were made by Koenig & Bauer (Germany); 14 Mergenthalers; and a complete bindery and photo-engraving plant; number of employees about 500.

Compañía Sud Americana de Billetes de Banco; office and works Chile and Paseo de Colon, retail stationery store Cangallo 559; lithographers, printers, publishers, engravers, blank-book manufacturers, stationers, type founders, importers of paper; established 1885. Equipment: Four double-feed Augsburg (German) magazine presses; G. Mann (English) two-color offset press; German press for printing from zinc; eighteen Koenig & Bauer (German) and Augsburg (German) cylinder presses; nine Faber (German) and Schmierss, Werner & Stein (German) stone lithographing presses; twenty Augsburg (German) automatic feeders; five American and seven German platen presses; three English pen ruling machines; seven Krause (German) cutting machines; six Brehmer (German) folding machines; three Brehmer (German) book-sewing machines; ten Brehmer (German) stitching machines; six Mergenthalers; seven German type-casting machines; photo-engraving, stereotyping, and electrotyping machines; 450 employees.

Casa Jacobo Peuser, general offices, stationery and book store San Martin 200, works Patricio 567, branch retail stores Rivadavia 2780, Buenos Aires, Rosario, and Bahia Blanca; printers, lithographers, engravers, stationers, book dealers, blank-book manufacturers, importers of paper; established 1867. Equipment: Two G. Mann (English) offset presses; 19 Augsburg (German), Marinoni (French), Koch (German), and Schmierss (German) letter-press and stone lithographing presses; two Augsburg (German) cylinder presses for art printing from glass plates; six automatic feeders; four Göbel (German) ticket-printing presses; ten C. & P. job presses; four Rockstroh and Schneider (German) platen presses; L. & M. (English) and Waite (English) die-stamping presses; six Förste & Tromm (German) disk ruling machines; nine Hickok pen ruling machines; seven Krause (German) cutting machines; Mansfeld (German) cutting machine; three Brehmer (German) folding machines; three Brehmer (German) book-sewing machines; three Brehmer (German) wire-stitching machines; nine French pedal numbering machines; two German typographs; photo-engraving plant; copper plate and steel engraving plant; 400 employees.

Caras y Caretas, S. A., Chacabuco 151; printers, publishers, engravers, importers of paper; established 1911. Equipment: Three Vogtlandische Maschinenfabrik (German) rotary magazine presses; ten Augsburg (German) cylinder presses; L. & M. (English) cylinder press; six Augsburg automatic feeders; two Krause (German) continuous book-trimming machines; two Krause (German) cutting machines; two platen presses; two Mergenthalers; four keyboards and three monotype casters; two German automatic gathering and stitching machines; photo-engraving and electrotyping plants; 200 employees.

Suc. de Ricardo Radaelli, offices and works Paseo Colon 1244; magazine and catalogue printers, lithographers, publishers, photo-engravers, importers of paper; established 1897. Equipment: Two G. Mann (English) offset presses; Augsburg (German) rotary perfecting magazine press; Serra Hermanos (Buenos Aires) rotary magazine press; Marinoni (French) semirotary magazine press; Miehle two-revolution cylinder press; L. & M. (English) two-revolution cylinder press; twelve Augsburg (German), Albert (German), and Marinoni (French) cylinder presses; nine Augsburg (German), Albert (German), and Marinoni (French) stone lithographing presses; four German platen presses; six Cross automatic feeders; three German automatic feeders; six Brehmer (German) folding machines; twelve Brehmer (German) stitching machines; four Krause (German) cutting machines; Mansfeld (German) cutting machine; eight Mergenthalers; two monotype casters and keyboards; photo-engraving, stereotyping, and electrotyping plants; 300 employees.

L. J. Rosso & Co., office and works Belgrano 463–475; printers, lithographers, photo-engravers, importers of paper; established 1893. Equipment: Augsburg (German) 32-page perfecting newspaper press; Marinoni (French) 16-page perfecting newspaper press; nine Augsburg (German) cylinder presses; Koenig & Bauer (German) cylinder press; two Schmierss, Werner & Stein (German) stone lithographing presses; five Augsburg (German) automatic feeders; five German platen presses; four Brehmer (German) folding machines; Brehmer (German) book-sewing machine; three Brehmer (German) stitching machines; two Krause (German) cutting machines; fourteen Mergenthalers; two German typographs; monotype caster and keyboard; photo-engraving and stereotyping plants, equipped with Royle machinery; 230 employees.

Kidd & Co., Reconquista 274; printers, stationers, blank-book manufacturers, publishers, importers of paper; established 1873. Equipment: Three Babcock Optimus cylinders; two Augsburg (German) cylinders; fourteen English platen presses; five English pen ruling machines; Furnival (English) cutting machine; Dexter folding machine Boston stitching machine; Brehmer (German) stitching machine· two Rosback stitching machines; Brehmer (German) book-sewing machine; Mergenthaler; German typograph, 180 employees.

José Tragant, Belgrano 438–450; printer, photo-engraver, importer of paper; established 1903. Equipment: Ten Augsburg (German) cylinder presses; two L. & M. (English) cylinder presses; two L. & M. (English) automatic die-stamping presses; L. & M. (English) automatic feeder; ten Schelter & Giesecke (German) platen presses; four Krause (German) cutting machines; two Will (German) ruling machines; three Brehmer (German) folding machines; six Brehmer (German) stitching machines; three model-8 Mergenthalers; photo-engraving plant; 120 employees.

Wiebeck, Turtle & Co., O'Brien 121; lithographers, printers, publishers, photo-engravers; established 1890. Equipment: One two-color and one one-color G. Mann (English) offset presses; two Miehle cylinders; Furnival (English) cylinder; Albert (German) cylinder; twelve Augsburg (German) cylinders; three Marinoni (French) cylinders; three small cylinders; eight Caxton (English) platen presses; three Victoria (German) platen presses; two Fenix (German) platen presses; Brillante platen press; complete binders and photo-engraving plant.

Mariana Rieu & Rossi, San Antonio 628; printers, lithographers, importers of paper; established 1890. Equipment: Three French, one Belgian, and one American stone lithographing presses; Augsburg (German) cylinder press; Augsburg (German) automatic feeder; three German platen presses; two Manchester (English) cutting machines; Brehmer (German) stitching machine; five Brehmer (German) machines for stitching boxes.

Saint Hermanos, Venezuela 1132; chocolate manufacturers, coffee roasters, printers, lithographers, paper-box manufacturers, photo-engravers, importers of paper; established 1907. Equipment: G. Mann (English) two-color offset press; two G. Mann (English) rotary presses for printing from zinc; Miehle cylinder press; seven Voirin (French), Augsburg (German), and Marinoni (French) cylinder presses; three Cross automatic feeders; two Krause (German) cutting machines; four Krause (German) die-stamping presses; Brehmer (German) stitchers and box-making machinery; photo-engraving plant; 100 employees.

Podestarelli y Bonfiglio, Rivadavia 4045; lithographers, printers, engravers, paper-box makers, steel plate printers, importers of paper; established 1892. Equipment: German rotary zinc press; thirteen German and French stone lithographing presses; three German and French cylinder presses; two German automatic feeders; twenty hand steel engraving presses; five Krause (German) cutting machines; Brehmer (German) and Krause (German) paper-box-making machinery; 75 employees.

Colombatti & Co., Paseo Colon 1180-1182; lithographers, printers, photo-engravers, importers of paper; established 1871. Equipment: Furnival (English) rotary zinc press; Hoe stone lithographing press; nine Augsburg (German), Faber (German), Albert (German), and Voirin (French) stone lithographing presses; two Augsburg (German) cylinder presses; one Cross and one German automatic feeders; five German platen presses; Waite & Saville (English) automatic jobber; two Krause (German) and two Mansfeld (German) cutting machines; Brehmer (German) folding machine; three Brehmer (German) stitching machines; photo-engraving plant; 100 employees.

Tailhade y Rosselli, offices and main stationery store Reconquista 258, branch store Rivadavia 1015; printers, stationers, blank-book manufacturers, importers of paper; established 1896. Equipment: Five Augsburg (German) cylinder presses; thirteen German platen presses; two Förste & Tromm (German) disk ruling machines; two English pen ruling machines; one Mansfeld (German) and one Krause (German) cutting machine; two Brehmer (German) book-sewing machines; 100 employees.

Enrique L. Frigero, Piedras 405–413; printer, blank-book manufacturer, importer of paper; established 1907. Equipment: Two Augsburg (German) cylinder presses; Koenig & Bauer (German) cylinder press; Dawson (English) cylinder press; two C. & P. platen presses; Universal platen press; German platen press; seven Förste & Tromm (German) disk ruling machines; two English pen ruling machines; one Krause (German) and one Mansfeld (German) cutting machine; three Krause (German) die-stamping presses; two Brehmer (German) book-sewing machines; two Brehmer (German) stitching machines; Rosback rotary perforator; model-5 Mergenthaler; 75 employees.

Sociedad Editorial Argentina, Rivadavia 649; newspaper printers; established 1910. Equipment: Marinoni (French) 32-page perfecting press; Marinoni (French) cylinder press; Krause (German) cutting machine; twenty-one Mergenthalers; 60 employees.

Lartigue & Co., Moreno 1476; lithographers, printers, photo-engravers, importers of paper; established 1875; Equipment: Six Marinoni (French) and Voirin (French) stone lithographing presses; two Augsburg (German) cylinder presses; two Winsbauch (German) cylinder presses; Voirin (French) cylinder press; Bonerger (German) cylinder press; eight German platen presses; three German ruling machines; three German cutting machines; five Mergenthalers; photo-engraving plant; 75 employees.

Alejandro Bianchi, Bartolomé Mitre 2600; lithographer, printer, paper-box manufacturer, importer of paper; established 1900. Equipment: Voirin (French) rotary zinc press; two Marinoni (French) and five German stone lithographing presses; one Cammorati (Italian) and two German cylinder presses; three Krause (German) cutting machines; three Krause (German) and three Mansfeld (German) die-stamping presses; six Brehmer (German) stitching machines; 60 employees.

Cagnasso y Milone, Paseo 650; printers, blank-book manufacturers, importers of paper; established 1905. Equipment: Three Augusta (Italian) cylinder presses; Augsburg (German) cylinder press; Koenig & Bauer (German) cylinder press; Wormatia (German) cylinder press; Simplice (German) cylinder press; six Diamante (German) platen presses; Exito (German) platen press; Waite & Sheard (English) ruling machine; three Krause (German) cutting machines; two Brehmer (German) stitching machines; Krause (German) die-stamping press; 50 employees.

Weiss & Preusche, Patricios 249; photo-engravers, three-color printers, importers of paper; established 1900. Equipment: Six German cylinder presses; two German automatic feeders; four German platen presses; one Mansfeld (German) and one Krause (German) cutting machine; two monotype keyboards and casters; photo-engraving and electrotyping plants; 75 employees.

Coni Hermanos, Peru 684; printers, publishers, importers of paper; established 1872. Equipment: Three Augsburg (German) cylinder presses; Augsburg (German) automatic feeder; two Victoria (German) platen presses; two Brehmer (German) book-sewing machines; three Brehmer (German) folding machines; Krause (German) cutting machine; two German typographs.

Antonio Flaiban, Cerrito 747; printer, binder, manufacturer of show cards, importer of paper; established 1898. Equipment: Three Augsburg (German) cylinder presses; five German platen presses; eleven Krause (German) and Mansfeld (German) die-stamping presses; three Krause (German) cutting machines; Brehmer (German) folding machine; three Brehmer (German) book-sewing machines; two Brehmer (German) stitching machines; German typograph; 50 employees.

Antonio Molinari, Talcahuano 1256; printer, binder, manufacturer of show cards; established 1891. Equipment: Two Augsburg (German) cylinder presses; Derriey (French) cylinder press; five German platen presses; three Krause (German) cutting machines; four Krause (German) die-stamping presses; two Förste & Tromm (German) ruling machines; Brehmer (German) folding machine; Brehmer (German) book-sewing machine; Brehmer (German) stitching machine; model-5 Mergenthaler; 45 employees.

Archelli y Viarengo, Estados Unidos 1719; lithographers, printers, importers of paper; established 1908. Equipment: Two Johannisberg (German) and two Schmierss, Werner & Stein (German) stone lithographing presses; Augusta (Italian) cylinder press; Krause (German) cutting machine; Brehmer (German) stitching machine; Century bronzing machine; 40 employees.

Otero & Co., Peru 658; printers, engravers; established 1907. Equipment: Three Augusta (Italian) cylinder presses; C. & P. platen press; two German platen presses; Waite (English) automatic die-stamping press; Augusta (Italian) cutting machine; Brehmer (German) folding machine; Brehmer (German) stitching machine; model-5 Mergenthaler; 30 employees.

Alfredo Cantiello, Venezuela 673; printer; established 1905. Equipment: Two Babcock Optimus presses; Augusta (Italian) cylinder press; two C. & P. platen presses; four Fenix (German) platen presses; Brehmer (German) folding machine; Brehmer (German) book-sewing machine; two Latham Monitor stitchers; Mansfeld (German) cutting machine; two Mergenthalers; 35 employees.

De Martino y Gutierrez, Rivadavia 1529; newspaper, magazine, and theatrical printers; established 1903. Equipment: One Marinoni (French) 24-page and one Albert (German) 16-page perfecting newspaper press; two Augusta (Italian) cylinder presses; eight Augusta (Italian) platen presses; two Krause (German) cutting machines; one model-8 and two model-5 Mergenthalers; 35 employees.

Angel Estrada & Co., Bolivar 466; publishers, printers, wholesale dealers in paper and school supplies; established 1863. Equipment: Eight Augsburg (German), Albert (German), and Marinoni (French) cylinder presses; two Krause (German) cutting machines; 35 employees.

Jockey Club, Tucuman 566; private printing plant of the Jockey Club; established 1890. Equipment: One Marinoni (French), one Koenig & Bauer (German), one Albert (German), two Johannisberg (German), and one Belgian cylinder press; C. & P. platen press; seven German platen presses; three Krause (German) cutting machines; 30 employees.

Colambini y Fernandez, Maipú 683; printers and lithographers; established 1915. Equipment: Wormatia (German) cylinder press; Marinoni (French) stone lithographing press; two Fenix (German), one Victoria (German), and one Augusta (Italian) platen press; Krause (German) cutting machine; Brehmer (German) stitching machine; model-5 Mergenthaler; 25 employees.

Virgilio Guerra, Chile 424; printer; established 1897. Equipment: Two Augsburg (German) cylinder presses; Marinoni (French) cylinder press; three platen presses; two Mergenthalers; French cutting machine; Brehmer (German) stitching machine; Brehmer folding machine; 30 employees.

Juan Perrotti, Defensa 523; printer; established 1907. Equipment: Johannisberg (German) cylinder press; Augsburg (German) cylinder press; Augsburg (German) automatic feeder; three German platen presses; Krause (German) cutting machine; two Mergenthalers; 25 employees.

Krause & Buscaglione, Sarmiento 2137; printers, stationers, importers of paper; established 1903. Equipment: Six Augsburg (German) cylinder presses; C. & P. platen press; Haddon (English) platen press; four German platen presses; two Krause (German) cutting machines; two Brehmer (German) stitching machines; 20 employees.

L. M. Oucinde, Defensa 777; printer; established 1877. Equipment: Three Albert (German) cylinder presses; five Fenix (German) platen presses; two Krause (German) cutting machines; Brehmer (German) stitching machine.

Droguería de la Estrella (Ltd.), Defensa 229; wholesale druggists, dealers in photographic paper and supplies, printers and lithographers. Equipment: Two Augsburg (German) cylinder presses; Cammorati (Italian) cylinder press; Augusta (Italian) platen press; Albert (German) platen press; three Liberty platen presses; two Krause (German) cutting machines; three Brehmer (German) stitching machines; Brehmer (German) folding machine; stereotyping plant; 35 employees.

Schenone Hermanos y Linari, Pasco 735; printers, importers of paper; established 1886. Equipment: Duplex 12-page flat-bed perfecting newspaper press; Marinoni (French) cylinder press; Augsburg (German) cylinder press; four German platen presses; Mansfeld (German) cutting machine; Menges folding machine; two Brehmer (German) stitching machines; three model-5 Mergenthalers; stereotyping plant; 20 employees.

Juan y Antonio Ceroni, San Martin 447; poster printers and lithographers; established 1883. Equipment: Three Marinoni (French) and two Augsburg (German) cylinder presses; Marinoni (French) stone lithographing press; four platen presses; Krause (German) cutting machine; 28 employees.

Viuda de Martinez y Cia., Alsina 731; lithographers, printers; established 1873. Equipment: One Voirin (French), one Marinoni (French), and one Cammorati (Italian) stone lithographing press; three German platen presses; three Krause (German) cutting machines; 22 employees.

Frias & Co., Entre Rios 1275; printers, stationers; established 1916. Equipment: Three Victoria (German) platen presses; two Diamant (German) platen presses; two other German platen presses; Krause (German) cutting machine; Brehmer (German) stitching machine; 15 employees.

Ramon Esteve, Peru 255–57; printer, stationer, manufacturer of blank books, wholesale paper dealer; established 1900. Equipment: Wormatia (German) cylinder press; three Rockstroh & Schneider (German) platen presses; Krause (German) cutting machine; Förste & Tromm (German) disk ruling machine; 15 employees.

Rinaldi Hermanos, Moreno 1972; printers; established 1909. Equipment: Augsburg (German) cylinder press; Gordon jobber; three German platen presses; Krause (German) cutting machine; Perfection stitching machine; 12 employees.

Orestes Capellano, San Juan 2353; printer; established 1911. Equipment: Albert (German) cylinder press; two German platen presses; German cutting machine; German stitching machine; 12 employees.

José A. Santos, Catamarca 145; printer; established 1905. Equipment: Wormatia (German) cylinder press; four Augusta (Italian) platen presses; Gordon jobber; Economy jobber; Krause (German) cutting machine; Brehmer (German) stitching machine; 18 employees.

José Lopez Garcia, Tacuari 761; printer; established 1907. Equipment: Two Augsburg (German) cylinder presses; three German platen presses; Krause (German) cutting machine; German typograph; 15 employees.

Luis Montmasson, Larrea 440; lithographer, printer, importer of paper; established 1913. Equipment: One Voirin (French) and three German stone lithographing presses; Babcock drum cylinder; four German platen presses; two Krause (German) cutting machines; 20 employees.

J. B. Cazes, Chacabuco 657; printer; established 1910. Equipment: Two Augsburg (German) cylinder presses; Wormatia (German) cylinder press; three platen presses; two Krause (German) cutting machines; 20 employees.

A. de Martino, Sarmiento 1291; printer, stationer; established 1905. Equipment: Augsburg (German) cylinder press; two Augusta (Italian) cylinder presses; three German platen presses; Krause (German) cutting machine; three Brehmer (German) stitching machines; 20 employees.

Belou, Tripaglia & Burzone, Chile 525; printers; established 1907. Equipment: Koenig & Bauer (German) cylinder press; five C. & P. platen presses; one Oswego cutting machine; 20 employees.

A. Laghi & Co., Moreno 1634; printers; established 1905. Equipment: Augsburg (German) cylinder press; two C. & P. platen presses; Marinoni (French) platen press; German platen press; Krause (German) cutting machine; three Brehmer (German) stitching machines; 17 employees.

Serantes Hermanos, Balcarce 173; printers, publishers, importers of paper; established 1902. Equipment: Five Augsburg (German) and one Belgian cylinder press; two German platen presses; Brehmer (German) folding machine; two Brehmer (German) stitching machines; Krause (German) cutting machine; two Mergenthalers; 28 employees.

Rivolin Hermanos, Salta 236; lithographers, printers, wholesale and retail stationers, importers of paper; established 1890. Equipment: Two French stone lithographing presses; six platen presses; ruling machine; three cutting machines; Brehmer (German) stitching machine; 25 employees.

Asilo de Huerfanos, Mexico 2670; private printing plant of orphan asylum; established 1900. Equipment: Two Augsburg (German) cylinder presses; four German platen presses; Waite & Sheard (English) ruling machine; Förste & Tromm (German) disk ruling machine; two Krause (German) cutting machines; two Brehmer (German) stitching machines.

Gotelli y Peralta, Callao 575; printers, publishers, importers of paper; established 1914. Equipment: Two Augsburg (German) cylinder presses; three German platen presses; Krause (German) cutting machine; two Brehmer (German) stitching machines; two Mergenthalers; 12 employees.

Leo Franco & Co., Avenida de Mayo 1139; printers; established 1913. Equipment: Augusta (Italian) cylinder press; C. & P. platen press; Gordon jobber; three German platen presses; Krause (German) cutting machine; two Brehmer (German) stitching machines; junior Mergenthaler; 12 employees.

Victor Pegorado, Tacuari 450; lithographer; established 1894. Equipment: Three Augsburg (German) stone lithographing presses; Augsburg (German) cylinder press; two Victoria (German) platen presses; Krause (German) cutting machine; 12 employees.

Ivaldi & Checchi, Carlos Pellegrini 635; publishers, printers, stationers; established 1876. Equipment: Two Augusta (German) cylinder presses; three German platen presses; Krause (German) cutting machine; 10 employees.

José Miquez, Lujan 299; linotype composition for the trade; established 1910. Equipment: Three Mergenthalers; 4 employees.

Geronimo Pesch, Rio Cuatro 1562; printer; established 1897. Equipment: L. & M. (English) cylinder press; Babcock Standard drum cylinder; Augsburg (German) cylinder press; four platen presses; Förste & Tromm (German) ruling machine; Oswego cutting machine; two Boston stitching machines; three Mergenthalers.

Garino y Bianchi, Larrea 971; printers and lithographers; established 1900. Equipment: Koch (German) lithographing press; Alauzet (French) lithographing press; Barre cutting machine; Koch bronzing machine; varnishing machine; three platen presses.

Ferrari Hermanos, Pueyrredon 2399; printers; established 1915. Equipment: Three German and one English platen press; Krause (German) cutting machine; Krause (German) perforating machine.

Colegio Leon XIII de Artes y Oficios, Dorrego 2120; printing-trades school. Equipment: One Albert (German), one Augsburg (German), and one Commorati (Italian) cylinder press; one Victoria (German), one Monopol (German), one Tip-Top (German), one Fenix (German), and one Linda (German) platen presses; Krause (German) cutting machine; Brehmer (German) stitching machine; Mergenthaler.

Ferrocarril de la Provincia de Buenos Aires; railway printing office. Equipment: Augsburg (German) cylinder press; Belgian cylinder press; ticket-printing press; Boston stitching machine; Oswego cutting machine.

F. Landreau & Co., Alsina 1243; printers, lithographers, manufacturers of blank books, importers of paper. Equipment: Two Augsburg (German) cylinder presses with automatic feeders; Albert (German) semi-duplex cylinder with automatic feeder; four Augsburg cylinder presses; Reliance (English) cylinder press; three platen presses; six German ruling machines; one Brehmer (German) book-sewing machine; three Brehmer (German) wire-stitching machines; two Krause (German) cutting machines; Foucher (French) cutting machine; two Krause (German) gilding machines; four perforating machines; two pedal numbering machines.

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Aquillo Hnos., Brasil 3299.
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Astengo, Manuel, Gaona 2332.
Atencio, Francisco U., Paricios 1870.
Baggiani y Paganini, Venezuela 1194.
Balestrini, Luis, Avenida La Plata 457.
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Campos & Co., Bolivar 1189.
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Caréac y Langlois, Viuda de, Rivadavia 2150.
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D'Andrea, Roberto, Santa Fe 1916.
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Demarco & Hnos., San Jose 1234.
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Denis, Nicolás C., Corrientes 2228.
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Giganti, Dante C., Rivadavia 6202.
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Gonzalez, Arrili B., Serrano 2459.
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Panza, Emilio, Defensa 153.
Pariente, A. J., & Co., Rivadavia 7133.
Pariente, Daniel E., & Co., Rivadavia 8360.
Pastor, Gervasio, Salta 528.
Pastor, M., & Co., Pavon 1064.
Pastorini, J. M., & Co., Independencia 3968.
Pech & Girard, Cerito 55.
Pedemonte, A., & Co., Colonia 151.
Pedemonte, Agustín, Peru 1245.
Pellerano, J. A., Rivadavia 6832.
Peña, Eustacio de la, Avenida Forest 651.
Pereira, Felipe, Bdo. de Irigoyen 970.
Perez, J., & Co., Piedras 753.
Perlardo & Co., Rivadavia 1731.
Perrotta, Roque F., Santa Fe 4615.
Pesch, Geronimo, Rio Cuatro 1563.
Petenello Hnos., Bme. Mitre 2339.
Petenello, Luis, Corrientes 562.
Petrocchi, A. R. & A., Bme. Mitre 1575.
Pichot & Co., Sarmiento 657.
Pidal, Elias, Avenida Saenz 963.
Pierelli, Ricardo, Defensa 864.
Pimentel, R., Tacuari 521.
Pitta, Francisco C., Montevideo 675.
Planas, Angel, Solis 1146.
Prado, Emilio é hijo, Avenida Montes de Oca 1034.
Proietto Hnos., San Juan 4025.
Pucci, Ireno é hijos, Corrientes 2119.
Quartaruolo Hnos., San Juan 2286.
Quintana, Carlos, Sgo. del Estero 1084.
Ramos, Jacinto M., Sarmiento 2602.
Raño, Vicente, Rivadavia 7893.
Raño, Lorenzo M., Sarandi 374.

Ravera y Profumo, Entre Rios 484.
Rezzonico, Juan E., Rivadavia 3799.
Ricci, Orestes, Reconquista 283.
Riera Hnos., Chacabuco 1542.
Rios, M. de los, Tacuari 289.
Ripoli, Fidel, Don Cristobal 574.
Riva, E., Independencia 3851.
Roa, Julio de, Lima 1029.
Robles & Co., Defensa 257.
Rodriguez, Giles M., Loria 434.
Rodriguez, Pedro J., Rivadavia 6219.
Rodriguez, Rafael, Medrano 267.
Roquez y Morroni, Libertad 132.
Rosas, Manuel A., Peru 143.
Rossini, Gaudencio, Lamadrid 1802.
Rossi, Federico, Salta 1315.
Rossoly, Otto, Maipu 731.
Rota, Jose, Bmel. 394.
Rotger, Pedro F., Lima 638.
Rouquard, A., Lerma 299.
Rubio, Daniel, Juramento 2427.
Saavedra, Oro T., Gascon 722.
Sabatella, Jose, Humberto I 2848.
Sacco, S., Brasil 1449.
Sáenz, José, Tacuari 1766
Saibene, Andrés, Canning 573.
Salas, F. A., Alsina 1575.
Salita, Gregorio, Corrientes 2227.
Sanmartino, Julio, General Soler 3802.
Samra, Miguel, Reconquista 866.
Samson, Lennox A., Cangallo 554.
Santangelo, Mauricio, Arara 150.
Schamun Hnos., Santa Fe 490.
Sciutti, Antonio, Cerrito 1117.
Sejas & Co., Sarmiento 643.
Semino, Carlos E., Rivadavia 7710.
Savesco, Pedro, Rioja 1846.
Sheridan y Rodolfo, Sarmiento 2002.
Sigler, Celestino, San Juan 1400.
Silva y Beretta, Reconquista 559.
Sipman, Herman, Mexico 3374.
Smart, J., Salado 1038.
Salita, Gregorio, Corrientes 2227.
Solé, Antonio, & Co., Angaco 135.
Somoza Hnos., Corrientes 877.
Sorkin, Solomón, San Juan 3177.
Sorrentino, Luis, Santa Fe 3399.
Spinelli, Emilio, Junin 845.
Story, W. Frank, & Co., 25 de Mayo 159.
Stroeymetre, G., Rivadavia 10887.
Suarez, Selin, Alberto 259.
Suzanne, P., Florida 130.
Teresano, Damian, Salta 517.
The British Supply Co., San Martin 428.
The British Printery, Maipu 433.
Tixi y Schaffner, Venezuela 336.
Tonini & Co., Cabildo 1953.
Trifoletti, P., & Hnos., Necochea 918.
Tropini, Pedro, Santa Fe 3287.
Ucha y Mirares, Victoria 850.
Uria Hnos., Liniers 1383.
Uriate & Co., Belgrano 1389.
Vacarezza, Felix, Nicaragua 5717.
Valdez, Alberto C., Serrano 1514.
Vargas, Raymundo, Paysandu 1252.
Varíschio, José, San Jose 1573.
Varsi Hnos., Bme. Mitre 702.

Veggia, Luis, Montevideo 219.
Velázquez, Viuda de Francisco, Cangallo 617.
Vila, Alberto C., Giribone 213.
Vilanova, Francisco, Esmeralda 87.
Vitlin, Leon, San Juan 2118.
"Volta," Corrientes 1418.
Wainstein, W., Patricios 1791.
Zaragoza, Manuel, Chile 1017.
Zeitlin, Guillermo, Lavalle 1124.
Zipman, Herman, Loria 774.
Zuppichini y Vargas, Belgrano 751.

GOVERNMENT PRINTING OFFICES, BUENOS AIRES.

Casa de Moneda, esq. Defensa y Mexico; Government establishment for printing bank notes, postage and revenue stamps, bonds, lottery tickets, etc.; printing and engraving departments established 1887. Equipment: Seven Lambert (French) two-color cylinder presses; three Revasse (French) cylinders; three L. & M. (English) cylinders with automatic feeders; three Augsburg (German) cylinders; two Mann (English) offset presses; two Johannisberg (German) stone lithographing presses; three small German cylinders; five Colt Armory platen presses; seven German platen presses; six Krause (German) cutting machines; Mansfeld (German) cutting machine; two Revasse (French) combined die-stamping and printing presses; two Revasse (French) and two Hermite (French) perforating presses; one Will (German) and one Förste & Tromm (German) disk ruling machine; Lambert (French) gumming machine; Brehmer (German) book-sewing machine; three Brehmer (German) wire-stitching machines; paper calendering machine; Revasse numbering machines; electrotyping and stereotyping plants; 242 employees.

Printing office of the Department of Agriculture, Florida 753; private printing, lithographing, and photo-engraving plant; established 1901. Equipment: Five Augsburg (German) cylinder presses; two Albert (German) cylinder presses; Voirin (French) cylinder press; four German stone lithographing presses; three German platen presses; three Krause (German) cutting machines; Smythe book-sewing machine; five Brehmer (German) stitching machines; two Brehmer (German) folding machines; three German typographs; photo-engraving plant; 115 employees.

Penitentiary Printing Office, Las Heras 3400; private printing, lithographing, and photo-engraving plant for the instruction of the prisoners and the production of work for various departments of the Government; established 1902. Equipment: Duplex (Zurich, Switzerland) flat-bed perfecting newspaper press; three Albert (German) cylinder presses; four Augsburg (German) cylinder presses; two Marinoni (French) cylinder presses; Augsburg (German) automatic feeder; three Faber (German) stone lithographing presses; two Förste & Tromm (German) disk ruling machines; Will (German) pen ruling machine; four Krause (German) cutting machines; ten German typographs; 150 prisoners employed.

Printing Office of the Police Department, Moreno 1550; private printing plant; established 1885. Equipment: Two German cylinder presses; three German platen presses; Krause (German) cutting machine; Brehmer (German) book-sewing machine; Waite & Sheard (English) ruling machine; 38 employees.

Printing Office of the Ministry of Public Works, Casa de Gobernación, Plaza de Mayo; private printing plant; established 1905. Equipment: Jullien (French) cylinder press; Johannisberg (German) cylinder press; Victoria (German) platen press; Krause (German) cutting machine; Brehmer (German) stitching machine; 29 employees.

Other Government printing offices: Secretary of War, Secretary of the Navy.

PRINTERS AND LITHOGRAPHERS OUTSIDE OF BUENOS AIRES.

ROSARIO.

B. Tambourini & Co., Sarmiento 656; printers, lithographers, stationers, blank-book manufacturers, importers of paper. Equipment: Five Marinoni (French) stone lithographing presses; French stone lithographing press; four Augsburg (German) cylinder presses; two Johannisberg (German) cylinder presses; four German platen presses; two Förste & Tromm (German) disk ruling machines; two Waite & Sheard (English) pen ruling machines; three Krause (German) cutting machines; German bronzing machine; three Krause (German) book-sewing machines; two Brehmer (German) stitching machines.

Woelflin & Co., General Mitre 743; lithographers, printers, stationers, photo-engravers, blank-book manufacturers. Equipment: Two Marinoni (French), two

Faber (German), three other German stone lithographing presses; two Augsburg, one Kosmos, and one Johannisberg (German) cylinder press; ten platen presses; three Krause (German) cutting machines; German bronzing machine; German varnishing machine; four Brehmer (German) book-stitching machines; pen ruling machine; six numbering machines; photo-engraving plant.

Compañía General de Artes Gráficas, S. A., San Lorenzo 1399; printers, lithographers, stationers, importers of paper. Equipment: Two German and one French stone lithographing presses; two Augsburg (German) cylinder presses; four Fenix (German) and one Victoria (German) platen presses; pen ruling machine; two Krause (German) cutting machines; three Brehmer (German) stitching machines; Marinoni (French) bronzing machine; Marinoni (French) varnishing machine; Krause (German) die press.

S. & M. Barragan, Santa Fe 1441; lithographers, printers, importers of paper. Equipment: Two Hugo Kock (German) and two Faber (German) stone lithographing presses; two Augsburg (German) cylinder presses; two Victoria (German), two Fenix (German), one Excelsior (German), and one Diamant (German) platen press; two Krause (German) cutting machines; pen ruling machine; Krause (German) varnishing machine; Krause (German) bronzing machine; two Krause (German) box machines; four Brehmer (German) stitching machines; four German pedal perforating machines; three pedal numbering machines; Mergenthaler; Canadian linotype.

Romanos Hermanos, Maipu 1307; printers. Equipment: Augsburg (German) cylinder press; Marinoni (French) cylinder press; three German platen presses; Krause (German) cutting machine; Brehmer (German) stitching machine; two Krause (German) pedal perforating machines; Canadian linotype.

Berizzo Hermanos, San Martin 540; printers, stationers. Equipment: Two Augsburg (German) cylinder presses; two Fenix (German) and two Victoria (German) platen presses; Klimsch (German) die-stamping press; Krause (German) cutting machine; Brehmer (German) stitching machine; two Klimsch (German) pedal numbering machines; Walter Honley pen ruling machine; pedal perforating machine.

A. Caubarrére, San Martin 746; printer, stationer, blank-book manufacturer. Equipment: One Augsburg (German) and one Wormatia (German) cylinder press; three German platen presses; pen ruling machine; Krause (German) cutting machine; Brehmer (German) stitching machine.

Emilio Fenner, Rioja 1235; printer, lithographer, importer of paper, photo-engraver, stationer. Equipment: Albert (German) stone lithographing press; Marinoni (French) and Augsburg (German) cylinder presses; one Victoria (German) and five Diamante (German) platen presses; Krause (German) cutting machine; Rosback rotary perforating machine; Canadian linotype; photo-engraving plant.

Miguel Pomponio, General Mitre 982; printer, stationer, linotype composition for the trade. Equipment: Augsburg (German) cylinder press; five German platen presses; Krause (German) cutting machine; Brehmer (German) stitching machine; two Canadian linotypes.

Longo & Argento, Sarmiento 1173; printers, stationers, book dealers. Equipment: Julien (Belgium) cylinder press; one Augusta (Italian) and two Diamante (German) platen presses; Krause (German) cutting machine; Brehmer (German) stitching machine.

Casa Jacobo Peuser, San Martin 824 (branch of Buenos Aires house); printers, stationers, importers of paper. Equipment: Augsburg (German) cylinder press; three platen presses; cutting machine; pen ruling machine.

Ruiz Hermanos, Corrientes 1247; printers. Equipment: One Prusiana (German) and one Marinoni (French) cylinder press; three German platen presses; Krause (German) cutting machine; Brehmer (German) stitching machine.

Colegio San José, Salta y España; printing-trade school of the Salesian Fathers. Equipment: Optima (Italian) cylinder press; two Fenix (German) and one Diamante (German) platen press; Krause (German) cutting machine; two Brehmer (German) stitching machines.

Colegio Infancia Desvalida, Pasco 451; private printing plant. Equipment: German cylinder press; one Victoria (German) and two Diamante (German) platen presses; Krause (German) cutting machine; Brehmer (German) stitching machine; stereotyping outfit.

Fossati & Co., San Martin and San Juan; printers, stationers. Equipment: One Fenix (German), one C. & P., and one Pearl platen press; Krause (German) cutting machine; Brehmer (German) stitching machine.

Other printers of Rosario: Federico Boldt, Moreno 535; Cappino, Bacino & Co., Santa Fe 1067; E. A. Larrazabel, Santa Fe 1176.

LA PLATA.

Taller de Impresiones Oficiales, Calle 1, between 58 and 59; printing office of the Province of Buenos Aires; established 1877. Equipment: G. Mann (English) 1-color offset press; six Augsburg (German) cylinder presses; two Albert (German) cylinder presses; Marinoni (French) cylinder press; two Schmierss, Werner & Stein (German) stone lithographing presses; two Faber & Schleicher (German) stone lithographing presses; two Augsburg (German) platen presses; four Krause (German) cutting machines; Augsburg (German) automatic feeder; three Brehmer (German) folding machines; two Brehmer (German) stitching machines; Brehmer (German) book-sewing machine; two Krause (German) stamping machines; two Waite & Sheard (English) pen ruling machines; Will (German) pen ruling machine; four French numbering machines; four German perforating machines; Rud. Jagenberg (German) gumming machine; two German typographs; five Mergenthalers; photo-engraving plant; 130 employees.

Olivieri & Dominguez, Calle 47 esq. 9; printers, lithographers, blank-book makers; established 1913. Equipment: Two Augsburg (German) cylinder presses; Albert (German) cylinder press; Schmierss, Werner & Stein (German) cylinder press; two Schmierss, Werner & Stein (German) stone lithographing presses; C. & P. platen press; five German platen presses; two Brehmer (German) stitching machines; two Förste & Tromm (German) disk ruling machines; Krause (German) cutting machine; 35 employees.

Christmann & Crespo, Calle 5, No. 870; printers, lithographers, stationers; established 1907. Equipment: Wormatia (German) cylinder press; Alauzet (French) stone lithographing press; seven Diamant (German) platen presses; two Krause (German) cutting machines; Brehmer (German) stitching machine; 20 employees.

Dante Oliva, Calle 13, No. 780; printer, stationer, bookdealer; established 1893. Equipment: Jullien (Belgian) cylinder press; Liberty platen press; three French and German platen presses; Krause (German) cutting machine; Brehmer (German) stitching machine; 10 employees.

Horacio Benavides, Calle 8, No. 745; printer, stationer; established 1904. Equipment: Heidelberg (German) cylinder press; Payne (English) cylinder press; four German platen presses; two Waite & Sheard (English) ruling machines; two Krause (German) cutting machines; Brehmer (German) stitching machine; 8 employees.

Suc. de José M. González, Calle 8 esq. 46; printers, stationers; established 1890. Equipment: Two Marinoni (French) cylinder presses; C. & P. platen press; English platen press; Marinoni (French) platen press; Krause (German) cutting machine; Brehmer (German) sewing machine; 10 employees.

Rava, Gusmerotti & Co., Calle 5, No. 789; printers, stationers, paper-box manufacturers; established 1909. Equipment: Augsburg (German) cylinder press; four German platen presses; two Krause (German) cutting machines; two Brehmer (German) stitching machines; 10 employees.

Luis Zanetta, Calle 8, No. 820; printer, blank-book manufacturer; established 1910. Equipment: Marinoni (French) cylinder press; three Diamant (German) platen presses; pen ruling machine; Mansfeld (German) cutting machine.

Casa Jacobo Peuser, Calle 7, No. 1001 (branch of Buenos Aires house); stationers, book dealers, printers; established 1867. Equipment: Three German platen presses; Krause (German) cutting machine.

S. Pereira, Calle 8, No. 967; printer, stationer; established 1899. Equipment: Three German platen presses; Italian cylinder press; Krause (German) cutting machine.

Elias H. Prieto, Diagonal 77 esq. 6 y 45; printer, stationer; established 1910. Equipment: Three German platen presses; Krause (German) cutting machine; Brehmer (German) stitching machine.

Carlos D. Pites, Diagonal 80, No. 769; printer, stationer; established 1912. Equipment: Three German platen presses; Krause (German) cutting machine; Brehmer (German) stitching machine.

Manuel Senzin, Calle 7, No. 1154; printer, dealer in paper. Equipment: Two German platen presses; Krause (German) cutting machine.

Smaller printers in La Plata: F. P. Crotti, Calle 12, No. 1459; S. Diotto, Diagonal 74, No. 732; Ricciardi Hnos., Calle 59, No. 778; Sciocco & Rosetti, Calle 12, No. 1350.

CORDOBA.

Alfredo Biffignandi, 9 de Julio 56; printer. Equipment: Three Augsburg (German) cylinder presses; five Victoria, Phoenix, and Diamant (German) platen presses; Krause (German) cutting machine; ruling machine; Brehmer (German) stitching machine.

Miquel Marot, 25 de Mayo 130; printer and lithographer. Equipment: Schmierss, Werner & Stein stone lithographing press; Augsburg (German) cylinder press; three German platen presses; two Krause (German) cutting machines; two Brehmer (German) stitching machines.

Alfredo M. Pereyra, Dean Funes 148; printer, stationer, book dealer. Equipment: Augsburg (German) cylinder press; six German platen presses; Krause (German) cutting machine; German typograph.

B. Tamburini & Co., San Martin 239; printers, lithographers, stationers. Equipment: German stone lithographing press; German cylinder press; four German platen presses; Krause (German) cutting machine.

Bautista Cubas, 27 de Abril 121; printer. Equipment: Augsburg (German) cylinder press; four German platen presses; Krause (German) cutting machine; model 5 Mergenthaler; German typograph.

Alfonso Aveta, Colon 80; printer. Equipment: Marinoni (French) cylinder press; four German platen presses; Krause (German) cutting machine; junior Mergenthaler.

Lucas Aveta, Rivadavia 42; printer. Equipment: Augusta (Italian) cylinder press; three Victoria (German) platen presses; Krause (German) cutting machine; Hogenförst (German) perforating machine.

M. Y. del Viso, Dean Funes 54; printer, stationer, book dealer. Equipment: Three German platen presses; Krause (German) cutting machine.

Vicente Rossi, Dean Funes 152; printer, stationer, bookdealer. Equipment: Wormatia (German) cylinder press; four German platen presses; Krause (German) cutting machine.

Eduardo Brandan, Lima 347; printer. Equipment: Three Hogenförst (German) platen presses; Krause (German) cutting machine; Brehmer (German) stitching machine.

Carcel Penitenciaría, Alta Cordoba; penitentiary printing office. Equipment: Augsburg (German) cylinder press; three German platen presses; Krause (German) cutting machine.

Andrés Funes Ortiz, 25 de Mayo 126. Equipment: Three C. & P. platen presses; cutting machine.

Francisco Rossi, Rivadavia 84; printer. Equipment: Marinoni (French) cylinder press; three German platen presses.

Felix Marzano, Alvear 17; printer. Equipment: Three German platen presses; Krause (German) cutting machine.

T. A. de Lampaggi, Cabrera 559; printer. Equipment: Three German platen presses; Krause (German) cutting machine.

Smaller printers in Cordoba: Gabriel Aubinel, Rosas 449; Martin Garzon, 25 de Mayo 42; Ramon Moreyra, Calle San Geronimo; El D. de Papeo, San Martin 429; M. Roselli, Abril 298.

TUCUMAN.

Prebisch y Violetto, Las Heras 363; printers, lithographers, stationers, book dealers, binders. Equipment: Two German stone lithographing presses; two Augsburg (German) cylinder presses; twelve German platen presses; Krause (German) cutting machine; ruling machine; two Brehmer (German) wire-stitching machines.

Anibal S. Medina, Alvarez 383; printer. Equipment: Augsburg (German) cylinder press; three German platen presses; Krause (German) cutting machine; Brehmer (German) stitching machine.

Viuda de Luis Casanovas, Las Heras 590; printer, stationer. Equipment: Three German platen presses; Krause (German) cutting machine; Brehmer (German) stitching machine.

Eduardo Marín, 24 de Septiembre, 795; printer. Equipment: Marinoni (French) cylinder press; three German platen presses.

Jurcovich y Aizicson, Las Heras 831; printers. Equipment: Two Schelter & Giesecke (German) platen presses; Krause (German) cutting machine.

José M. Gonzales, Las Heras 421; printer, stationer. Equipment: Two German platen presses; German cutting machine.

MENDOZA.

Jaime Mas; printer, stationer, book dealer. Equipment: Augsburg (German) cylinder press; eight German platen presses; Förste & Tromm ruling machine; Krause (German) cutting machine; two Brehmer (German) stitching machines.

Felix Best, San Martin 1333; printer, stationer, book dealer: established 1887. Equipment: Wormatia (German) cylinder press: four German platen presses; Krause (German) cutting machine; Brehmer (German) stitching machine; ruling machine; model-5 Mergenthaler.

Juan Verdaguer; printer, stationer, book dealer. Equipment: Augsburg (German) cylinder press; four platen presses; Krause (German) cutting machine.

Rotta Hermanos; lithographers and printers. Equipment: German stone lithographing press; two German platen presses; Krause (German) cutting machine.

Mariconda y Marengo; printers. Equipment: Augsburg (German) cylinder press; Marinoni (French) cylinder press; three German platen presses; Krause (German) cutting machine.

Eduardo Gonzales, San Luis 66; printer and dealer in paper and printers' supplies. Equipment: Marinoni (French) cylinder press; two platen presses; German cutting machine.

Pablo Cohn, Lavalle 16; printer, stationer, and paper dealer. Equipment: Two platen presses; cutting machine.

Vicente Pellegrino; printer. Equipment: Marinoni (French) cylinder press; three platen presses; Krause (German) cutting machine; Brehmer (German) stitching machine.

SALTA.

Anteza Hermanos; printers, paper dealers. Equipment: Augsburg (German) cylinder press; four platen presses; Krause (German) cutting machine; Brehmer (German) stitching machine.

Antonio Rodriguez; printer, stationer. Equipment: Marinoni (French) cylinder press; four platen presses; Krause (German) cutting machine.

Cosme Monerris; printer, stationer. Equipment: Marinoni (French) cylinder press; three German platen presses; Krause (German) cutting machine.

Pascual y Baileron de las Lanas; printers, stationers. Equipment: Augsburg (German) cylinder press; three German platen presses; Krause (German) cutting machine; Brehmer (German) stitching machine.

L. Bennasser; printer. Equipment: Marinoni (French) cylinder press; two platen presses; cutting machine.

JUJUY.

Teresa M. de Perovic; printer, stationer. Equipment: Marinoni (French) cylinder press; three German platen presses; German cutting machine.

BAHIA BLANCA.

Ricardo G. Ducos, Avenida Colon 349; printer, importer of paper. Equipment: Two Augsburg (German) cylinder presses; two Victoria (German) platen presses; four small platen presses; Krause (German) cutting machine; two Brehmer (German) stitching machines.

Panzinni Hermanos & Co., Chiclana 269–275; printers, stationers, importers of paper. Equipment: Wormatia (German) cylinder press; four German platen presses; Krause (German) cutting machine; Brehmer (German) stitching machine.

Casa Jacobo Peuser, Sarmiento 36 (main store, Buenos Aires); printers, stationers, importers of paper. Equipment: German cylinder press; ruling machine; four platen presses; Krause (German) cutting machine.

PHOTO-ENGRAVERS, BUENOS AIRES.[1]

Aregoni, A. & Co., Lavalle 445.
Cogliati, E., Alsina 1781.
Franzoni, Helvecio, Rivadavia 1615.
Galliani, Ricardo, Reconquista 387.
Lucas, O., Sarmiento 354.
Martin, Raimundo, Chacabuco 334.
Mas, Jesús, Tacuari 1377.
Moldes y Franchi, Lavalle 547.
Petrone Hnos., Corrientes 1324.
Rossi y Lull, Cangallo 378.
"Serantes," Balcarce 173.
Vidal, Luis, Estados Unidos 1629.

BINDERS, BUENOS AIRES.[2]

Altman, Elias, Andes 528.
Antich, Juan, Corrientes 1835–1837.
Bareta, Francisco, Ceballos 982.

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[1] See also "Printers and lithographers" and "Newspapers."

[2] See also "Printers and lithographers."

Bordoy, Marcelino, Venezuela 1154.
Broghera Hnos., Santo Domingo 2235.
Canals, Damian, Belgrano 1123.
Caperan, Alfonso, Belgrano 1186.
Corso, Jorge F., Tucuman 847 (ruler only).
Dieguez, Celestino, Conesa 1430.
Dimitrijewits, S., Corrientes 363.
Donnis, Natalio, Victoria 1812.
Flaiban, Natalio, Boulogne sur Mer 881.
Gabay, Emilio, Rivadavia 1017.
Gualtieri é hijos, Montevideo 771.
Hagen, Guillermo José, Maipu 531.
Janza, Marcelino F., Bolivar 650.
Kurlat Hnos., Bolivar 889.
La Unión Iglesia, Viamonte 955.
Maristany, Manuel, Pavon 2281.
Marruccelli, Juan, O'Brien 245.
Moreno, Santiago, Talcahuano 482.
Moretti y Zambra, Tucuman 307.
Polera y Bonifacio, Mexico 665.
Repetto, Vicente, Chile 531.
Rodrigo, Joaquín, S. del Estero 638.
Salvatella, Juan, Carlos Calvo 675.
San Juan, Carlos, San Juan 1864.
Schroeder, Jacobo, Viamonte 1473.
"Serantes," Balcarce 173.
Songia Hnos., Nicaragua 4666.
Sorrentino, Muis, Thames 2273.
Soteras y Val, Alsina 1251-1255.

TIN-PLATE PRINTERS, BUENOS AIRES.

Bunge, E. A., y J. Borne, Herrera 1253.
Canale, Viuda de, é hijos, Martin Garcia 316-32.
Cardellino & Co., Florida 211.
La Cromo Hojalatería Argentina, S. A., Rivadavia 3613.
Moggio & Co., Avenida La Plata 733.
Montarón, Julio L., Garay 2338.

MANUFACTURERS OF PLAYING CARDS, BUENOS AIRES.

Compañía General de Fósforos, California 2600.
Girbau, Francisco, Cangallo 2686.

MANUFACTURERS OF CARBON PAPER, BUENOS AIRES.

H. Pessina, Saavedra 452-58.
Viel, A., Querandies 4288.

MANUFACTURERS OF BLUE-PRINT PAPER, BUENOS AIRES.

Aretz & Co., Reconquista 458.
Fábrica Nacional de Papeles Heliográficos, Esmeralda 564.

MANUFACTURERS OF SANDPAPER, BUENOS AIRES.

Bacigalupo y Scotto, Gurruchaga 342.

MANUFACTURERS OF ENVELOPES, BUENOS AIRES.

Barbieri, José S., Pueyrredon 545.
Esswein, A., Bolivar 362-68.
Fumagalli, Zaverio, Rivadavia 1928.
Laghi, Tomás, Venezuela 1666.
Latté, Curt & Co., Alberti 40.

MANUFACTURERS OF PAPER SACKS, BUENOS AIRES.

Bruce, David, Montevideo 783.
Camia, Carlos, Aguilar 2143.
Dubertrand, A., é hijos y Pene Donato, Alvarez 1196.
Espagnol Hermanos, Pringles 450.
Esswein, A., Bolivar 362.
Fraccia y Agrás, San Salvador 4218.
Guasch, Jaime, Avenida Montes de Oca 876.
Latté, Curt & Co., Alberti 40.
Rafarr, Pablo, San Salvador 3902.
Also all paper mills.

MANUFACTURERS OF RUBBER STAMPS, BUENOS AIRES.

Andrieu, B., Carlos Pellegrini 571.
Arasanz, Hipolito, B. de Irigoyen 453.
Barattola & Santiago, Alsina 1039.
Barés, Enrique, Victoria 537; Sarmiento 825.
Bares, J. B., Corrientes 861.
Barreiro, Pedro, Saenz-Pena 153.
Bianchini, Viuda de, é hijos, Viamonte 1557.
Calviño, Seoane B., Chacabuco 1022.
Collado, Juan, Piedras 543.
Ducco, Luis S., Constitucion 2856.
Elipe, Vicente, Venezuela 1353.
Fatturini, A., & Co., C. Pellegrini 888.
Fontana, Victoria, Mexico 1231.
Gottuzzo, Juan, & Co., Cangallo 872.
Horta & Co., Bme. Mitre 744.
Marpons, M., Salta 855.
Muscio, Savoia M., Oruro 1220.
Perichon Hnos., Independencia 3195.
Varea, Victor B., Corrientes 316.

PAPER MILLS.

La Argentina (S. A.) para la Fabricación de Papel; main offices, Bolivar 393, Buenos Aires; cable address, Zarafabrik, Buenos Aires; established 1888; mill at Zarate, 57 miles from Buenos Aires, on Argentine Central Railway and Parana River; sidetrack at mill. Equipment: Nine Fourdrinier machines (eight German and one American); eighteen paper-bag machines. Product: Printing, writing, wrapping, news print, colored poster, tissue, sacks, cardboard. Capacity: Sixty tons per day; 1916 production, about 10,000 tons.

Compañía General de Fósforos; main offices, Lima 239, Buenos Aires; established 1906; mill at Bernal, 6 miles from Buenos Aires, on Argentine Southern Railway; sidetrack at mill. Equipment: One 108-inch and one 120-inch Moore & White Fourdrinier machine; nineteen beaters; two Jordan engines; five newspaper grinders; three coating machines; steam and electric power. Product: Printing, writing, and wrapping paper, coated paper, cardboard, sacks. Capacity: Thirty-four tons per day; 1916 production, about 9,000 tons.

Fábrica de Papel "El Fenix" (S. A.); main offices, Reconquista 46, Buenos Aires; cable address, Fenixpapel, Buenos Aires; established 1914. Mill at Campaña, on Argentine Central Railway and Parana River, 50 miles from Buenos Aires. Equipment: One 116-inch (German) and one 94-inch (Austrian) Fourdrinier machine; small machine for grinding mechanical pulp; steam and electric power. Product: Printing, writing, and wrapping paper, news print, cardboard. Capacity: Nineteen tons per day; 1916 production, about 4,000 tons. Mill at Vicente Lopez, on Argentine Central Railway, 8 miles from Buenos Aires (not in operation). Equipment: One 94-inch, one 85-inch, and one 72-inch Fourdrinier machine (Belgian); steam and electric power. Capacity: Twenty tons per day.

Fábrica de Papel (Casati) de San Nicolás (S. A.); main office and mill at San Nicolas, on Argentine Central Railway and Parana River, 148 miles from Buenos Aires, side-track at mill. Equipment: Two Fourdrinier machines. Product: Printing, writing, and wrapping paper. Capacity: Twelve tons per day; 1916 production, about 2,000 tons.

Iturrat, Manassero & Co.; main offices, Pozos 841-57, Buenos Aires; mill at Andino, 24 miles from Rosario, on Argentine Central Railway. Equipment: Two 55-inch Fourdrinier machines. Product: Wrapping, packing, and cover paper. Capacity: Six tons per day; 1916 production, about 1,000 tons.

Parovi y Rodriguez Canedo; main office and mill at Bancalari, 15 miles from Rosario, on Argentine Central Railway. Equipment: Two 55-inch Fourdrinier machines. Product: Wrapping, packing, and cover paper. Capacity: Five tons per day; 1916 production, about 600 tons.

Oliva & Co., Cordoba. Equipment: Small Fourdrinier machine. Product: Wrapping paper. Capacity: Three tons per day; 1916 production, about 600 tons.

Santiago Marietta, Pasaje Ayacucho 3810, Saladillo, 4 miles from Rosario. Equipment: Small Fourdrinier machine. Capacity: Two tons per day; 1916 production, about 300 tons.

Gilchrist & Co.; main offices, Lavalle 333, Buenos Aires; mill at Dock Sur, Buenos Aires. Equipment: Two board machines. Product: Gray cardboard. Capacity: Five tons per day; production in 1916, 2 tons per day.

URUGUAY.

PRINCIPAL NEWSPAPERS AND MAGAZINES IN MONTEVIDEO.

El Día, Mercedes 826; morning daily, established 1885; 6 to 12 pages, 18 by 26 inches; 36¼-inch rolls; circulation, 38,000. Equipment: Two Marinoni (French) 24-page perfecting presses; ten Mergenthalers. Foreign subscription price, $12 per annum; advertising rates, $1 to $2 per inch (see advertising rate card, exhibit No. 1).

El Plata, Buenos Aires 666; afternoon daily; established 1913; 6 to 12 pages, 17½ by 24½ inches; 35-inch rolls; circulation, 25,000 to 27,000. Equipment: Marinoni (French) 24-page perfecting press; seven Mergenthalers; photo-engraving plant. Foreign subscription price, $12 per annum; advertising rates, $0.75 to $1.25 per inch (see advertising rate card, exhibit No. 1).

La Razón, Rincon 853; afternoon daily; established 1878; 6 to 12 pages, 17½ by 24½ inches; 35-inch rolls; circulation, 25,000 to 30,000. Equipment: Marinoni (French) 32-page perfecting press; Marinoni (French) 8-page perfecting press; Duplex (Swiss) flat-bed perfecting press; one Augsburg (German) and one Albert (German) cylinder press; French ticket-printing press; three German platen presses; Krause (German) cutting machine; Brehmer (German) stitching machine; seven Mergenthalers. Foreign subscription price, $9 per annum; advertising rates, $0.50 to $1.50 per inch (see advertising rate card, exhibit No. 1).

Tribuna Popular, Ciudadela 1426; afternoon daily (in normal times also publishes morning edition); 6 to 8 pages, 15¾ by 23 inches; 31½-inch rolls; circulation, 25,000 to 30,000. Equipment: Marinoni (French) 32-page perfecting press; 8 Mergenthalers; two monotypes; photo-engraving plant. Foreign subscription price, $14 per annum; advertising rates, $0.70 to $2.50 per inch (special rate of $10 per inch per month on certain advertising pages).

El Siglo, Rincon 853; morning daily; established 1863; 6 to 12 pages, 17½ by 24½ inches; 35-inch rolls; circulation, 10,000 to 12,000. Equipment: Same as La Razón. Foreign subscription price, $16 per annum; advertising rates, $0.375 to $1.25 per inch (see advertising rate card, exhibit No. 1).

Diario del Plata, Buenos Aires 666; morning daily; established 1910; 6 to 12 pages, 17½ by 24½ inches; 35-inch rolls; circulation, 10,000 to 12,000. Equipment: See El Plata. Foreign subscription price, $16 per annum; advertising rates, $0.50 to $1 per inch (see advertising rate card, exhibit No. 1).

El Telégrafo, Rincon 853: afternoon daily; established 1850; 6 to 8 pages, 17½ by 24½ inches; 35-inch rolls; circulation, 8,000 to 12,000. Equipment: See La Razón. Foreign subscription price, $9 per annum; advertising rates, $0.25 to $1.25 per inch (see advertising rate card, exhibit No. 1).

La Mañana, Ciudadela 1478-90; morning daily; established 1917; 6 to 12 pages, 17½ by 24½ inches; 35-inch rolls; circulation, 8,000 to 10,000. Equipment: Marinoni (French) 24-page perfecting press; seven Mergenthalers; photo-engraving plant. Foreign subscription price, $10 per annum; advertising rates, $0.375 to $0.75 per inch.

El Pueblo, Plaza Independencia 703; afternoon daily; established 1917; 6 to 8 pages, 17½ by 24½ inches; 51½ and 70 inch rolls; circulation, 6,000. Foreign subscription price, $10 per annum; advertising rates, $0.375 to $0.75 per inch; printed by El Bien.

La Democracia, Ciudadela 1399; morning daily; established 1916; 6 to 8 pages, 17½ by 24½ inches; 51½ and 70-inch rolls; circulation, 6,000 to 8,000. Equipment: Four Mergenthalers (press work done by El Bien). Foreign subscription price, $16 per annum; advertising rates, $0.375 to $0.75 per inch (see advertising rate card, exhibit No. 1).

El Diario Español, Ituzaingo 1487; morning daily devoted to the interests of the Spanish colony; established 1914; 6 to 8 pages, 17½ by 24½ inches; 35-inch rolls; circulation, 4,000. Foreign subscription price, $9 per annum; advertising rates, $0.25 to $0.50 per inch; printed by La Razón.

El Bien, Ciudadela 1469; morning daily; established 1878; 6 to 8 pages, 17½ by 24½ inches; 35, 51½, and 70 inch rolls; circulation, 3,500. Equipment: Duplex (Swiss) flat-bed perfecting press; one Marinoni (French) and one Italian cylinder press; one Fenix (German) and one American Gordon platen press; four Mergenthalers. Foreign subscription price, $10 per annum; advertising rates, $0.25 to $1.25 per inch (see advertising rate card, exhibit No. 1).

La Defensa Comercial, Av. 18 de Julio 1017; afternoon commercial journal; established 1917; 8 pages, 13½ by 19¼ inches; circulation, 1,800. Foreign subscription price, $16 per annum; advertising rates, $0.25 to $1.25 per inch; printed by José M. Blanco.

Montevideo Times, 25 de Agosto 410; morning daily in English; established 1888; 8 pages, 13½ by 19¼ inches; circulation, 1,000. Foreign subscription price, $16 per annum; advertising rates, $1.25 per inch per month; printed by Angel Lasagna.

Diario Oficial, Florida 1178; official daily of the Uruguayan Government; established 1849; 44 to 60 pages, 9¼ by 12¾ inches; circulation, 3,000. Equipment: Marinoni (French) semi-duplex cylinder press; Albert (German) cylinder press; eight Mergenthalers. Foreign subscription price, $9 per annum; legal advertising only.

El Debate, Sarandi 430; daily organ of the German colony; established 1917; 4 pages, 11½ by 16 inches; circulation, 3,000. Foreign subscription price, $6 per annum; printed by José M. Blanco.

Uruguay Sport, San Jose 1118; sporting triweekly; established 1916; 6 to 8 pages; 17½ by 24½ inches; circulation, 6,000. Foreign subscription price, $9 per annum; advertising rates, $0.25 to $1.25 per inch; printed by El Bien.

El Amigo del Obrero, Mercedes 947; labor semiweekly; established 1898; 4 pages, 16 by 23¼ inches; circulation, 3,000. Foreign subscription price, $3.60 per annum; advertising rates, $0.10 to $0.25 per inch; printed by José M. Blanco.

El Estanciero, Avenida General Rondeau 1685; semimonthly stock and agricultural journal; established 1910; 28–32 pages, 9¾ by 12½ inches; circulation, 2,500. Foreign subscription price, $2.50 per annum; advertising rates, $10 per page per month (see advertising rate card, exhibit No. 1).

El Hacendado, Ituzaingo 1439; semimonthly stock and agricultural magazine; established 1900; 52 pages, 8½ by 11½ inches; circulation, 4,500. Foreign subscription price, $2.50 per annum; advertising rates, $20 per page.

Vida Americana, Misiones 1489; monthly farming and stock-raising magazine; established 1917; 74 pages, 8½ by 11¾ inches; circulation, 5,000. Foreign subscription price, $2.50 per annum; advertising rates, $20 per page.

El Economista Uruguayo, Zabala 1441; semimonthly commercial journal; established 1916; 60 pages, 7¼ by 10¾ inches; circulation, 3,000. Foreign subscription price, $8 per annum; advertising rates, $20 per page; printed by Enrique Escalante.

Selecta, Ciudadela 1387; monthly literary and social journal in colors; established 1917; 36 pages, 10½ by 14½ inches; circulation, 2,500. Foreign subscription price, $11 per annum; advertising rates, $30 per page; printed by A. Barreiro & Co.

Uruguay Weekly News, Canelones 1814; weekly in English; established 1897; 12 pages, 12½ by 17 inches; circulation, 1,500. Foreign subscription price, $12 per annum; advertising rates, $0.10 to $0.25 per inch; printed by José M. Blanco.

La Verdad, Sarandi 430; weekly devoted to the interests of the German colony; established 1916; 4 pages, 16 by 23¼ inches; circulation, 3,000. Foreign subscription price, $2 per annum; no advertising; printed by José M. Blanco.

La Revista Blanca, Maldonado 1187; literary and humorous trimonthly; established 1913; 24 pages, 6 by 9 inches; circulation, 2,500. Foreign subscription price, $6 per annum; advertising rates, $20 per page.

Arquitectura, Avenida 18 de Julio 917; architectural and engineering magazine published every other month; established 1914; 32 to 48 pages, 9¾ by 13¼ inches; circulation, 2,000. Foreign subscription price, $2.50 per annum; advertising rates, $16 per page, $10 per half page, $7 per quarter page; printed by A. Barreiro & Co.

Minerva, Avenida 18 Julio 917; medical magazine published in the interest of the Medical Club of Uruguay every other month; established 1916; 32 pages, 9¼ by 13¼ inches; circulation, 1,500. Foreign subscription price, $2.50 per annum; advertising rates, $16 to $20 per page; printed by Peña Hermanos.

El Noticiero, Casilla de Correo 486; semimonthly; established 1916; 16 pages, 9¾ by 13¼ inches; circulation, 5,000. Foreign subscription price, $1 per annum; printed by José M. Blanco.

La Campaña, Uruguay 782; monthly house organ of A. Bertolotti; established 1911; 22 pages, 9¾ by 13¼ inches; circulation, 5,000. Distributed free; printed by José M. Blanco.

Cinema, 25 de Mayo 371; trimonthly motion-picture journal; 8 pages, 13½ by 19½ inches; established 1917; circulation, 2,000. Foreign subscription price, $6 per annum; advertising rates, $0.20 per inch.

La Causa Rural, Rio Negro 1572; weekly devoted to rural interests; established 1916; 4 pages, 15 by 22 inches; circulation, 1,000. Foreign subscription price, $2 per annum.

Federación Rural, Ituzaingo 1389; monthly devoted to rural interests; established 1916; 24 pages, 8½ by 13 inches; circulation, 1,500. Foreign subscription price, $2 per annum.

La Homiga, Reconquista 283; children's monthly; established 1913; 16 pages, 5¼ by 8¼ inches; circulation, 1,000. Foreign subscription price, $1.50 per annum.

El Democrata, Hocquart 1583; semimonthly political organ; established 1900; 4 pages, 13½ by 19½ inches. Foreign subscription price, $2.40 per annum.

Revista de la Asociación Politécnica del Uruguay, Sarandí 562; monthly; 36 pages, 9 by 11 inches. Foreign subscription price, $4 per annum.

Revista del Centro Militar y Naval, Avenida 18 de Julio 1236; monthly army and navy journal; established 1902; 112 pages, 6 by 9 inches; circulation, 1,000. Foreign subscription price, $2.50 per annum.

Revista del Centro Farmacéutico Uruguayo, Ejido 1589; pharmaceutical magazine published every other month; established 1892; 48 pages, 7 by 10 inches; circulation, 1,000. Foreign subscription price, $5 per annum.

Revista del Ministerio de Industrias, 25 de Mayo 511; monthly magazine published by the Department of Industries of the Uruguayan Government; established 1912; 120 pages, 6 by 9 inches; circulation, 3,000. Distributed free; printed by the Imprenta Nacional.

Revista del Consejo Nacional de Higiene, Sarandí 442; monthly magazine devoted to health; established 1906; 64 pages, 7 by 11 inches; circulation, 2,000. Foreign subscription price, $2.50 per annum.

Revista de la Asociación Rural de Uruguay, Uruguay 864; monthly magazine of the Agricultural Society of Uruguay; established 1871; 48 pages, 7 by 11 inches; circulation, 2,000. Foreign subscription price, $4 per annum.

Revista de Precios Corrientes, Estación de F. C. Central; weekly review of current prices; established 1897; 4 pages, 9¾ by 13¼ inches.

Revista Mensual de la Camera Mercantil de Productos del País, Estación de F. C. Central; monthly review of prices; established 1911; 32 pages, 6¾ by 9¾ inches.

OTHER PUBLICATIONS IN MONTEVIDEO.

Agros, Sayago; monthly, published by the School of Agriculture.

Anales de Instrucción Primaria, 18 de Julio 1205; devoted to primary instruction.

Anales de la Liga de Estudiantes Americanos, Rincon 508; devoted to university interests.

Anales de la Universidad, 18 de Julio 1824; devoted to university interests.

Anales Mundanos, Ituzaingo 1414.

Boletín de la Camara de Comercio Italiana, Colon 1395; monthly bulletin of the Italian Chamber of Commerce.

Boletín de la Dirección General de Estadística, Colon 1515; monthly bulletin of the Statistical Department of the Uruguayan Government.

Boletín de la Liga Uruguaya Contra la Tuberculosis, Magallanes 1320; monthly bulletin of the Anti-Tuberculosis Society.

Boletín Mensual de la Estadística Municipal, Paraguay esq. 18 de Julio; monthly statistical bulletin of the city of Montevideo.

Boletín del Ministerio de Hacienda, Rincon 480; monthly bulletin of the Secretary of the Treasury.

Revista del Comercio Español, 18 de Julio 877; monthly review of the Spanish Chamber of Commerce.

Revista de la Asociación Fraternidad, San Jose 1215; monthly bulletin of the Fraternal Association.

Revista de la Asociación Centro de Almacenros Minoristas, Cerito 326; monthly bulletin of the Retail Merchants' Association.

Revista de la Asociación Unión Industrial Uruguaya, Treinta y Tres 1327; monthly bulletin of the Industrial Union of Uruguay.

Revista del Colegio Pio, Villa Colon; monthly school journal.

Revista de la Sociedad de Médicos Veterenarios, Uruguay 864; monthly bulletin of the Veterinary Society.

Revista del Circulo Napolitano, Soriano 1197; monthly organ of the Circulo Napolitano.

Revista de la Sociedad del Socorro Mutuo Español; monthly organ of the Spanish Mutual Society.

Euskal Erria, San Jose 1168; trimonthly organ of the Basque colony in Montevideo.

L'Italiano, Treinta y Tres 1325; weekly journal in Italian, devoted to the interests of the Italian colony.

Paginas Blancas, Soriano 1122; monthly literary journal.

Natura, C. Largo 1183; monthly magazine devoted to the study of nature.

La Propiedad Territorial, Juncal 1423; monthly journal devoted to rural matters.

Revista del Aduana Uruguaya, La Aduana; monthly, devoted to customhouse matters.

Revista de Correos y Telégrafos, Oficina General de Correos; monthly, devoted to postal and telegraph matters.

Vitorica Mueños, O. del Plata 1014; monthly, devoted to live-stock matters.

El Socialista, Rio Branco 1375; weekly socialistic journal.

El Libre Pensamiento; monthly, devoted to free thought.

Montevideo Musical; musical journal, published every other month.

La Propaganda, Daiman 1516; monthly rural magazine.

Industria y Comercio, 18 de Julio 1056; monthly rural magazine.

Higiene y Salud; monthly health journal.

NEWSPAPERS OUTSIDE OF MONTEVIDEO.

Canelones: El Baluarte, La Reacción.
Colonia Vandelse: La Unión Vandelse.
Durazno: La Acción Cívico, El Progreso, La Publicidad, El Nuevo Heraldo, La Aurora, El Combate.
Florida: La Voz de la Florida, El Imparcial, Piedra Alta.
Maldonado: El Combate, La Impresora, La Defensa, La Voz Estudantil.
Melo: El Deber Cívico, La Defensa, El Pueblo, El Cerro Largo, El Nacionalista, El Partido Colorado.
Mercedes: Vida Chana, El Día, El Diario, El Progreso, La Prensa.
Minas: La Idea, El Voz del Verdun, La Unión, La Luz.
Nueva Palmira: El Eco de Palmira.
Paysandú: El Telégrafo, El Diario, La Tribuna, El Paysandú.
Paso de los Toros: El Pueblo.
Rivera: El Comercio, La France, Rivera.
Rocha: La Idea, El Lascanense.
San Carlos Mald.: El Civismo, El Imparcial, La Reforma.
San Fructuoso: La Aurora, El Uruguay, El Trabajo, El Heraldo, El Nacional.
Salto: Ecos de Progreso, Tribuno Saltena, La Tarde, Diario Nuevo.
San Jose: La Mañana, El Pueblo, La Paz, El Trabajo, La Palabra, Los Principios.
Treinta y Tres: El Trabajo, El Comercio, La Acción.

PRINTERS AND LITHOGRAPHERS, MONTEVIDEO.

Barreiro & Co., offices and retail store J. C. Gomez 1450, plant B. Mitre 1467; printers, lithographers, stationers, book dealers, publishers, wholesale paper dealers, dealers in printers' supplies, photo-engravers, manufacturers of blank books and envelopes, importers of paper; established 1871. Equipment: Three Miehle two-revolution cylinder presses; Babcock two-revolution cylinder press; five Augsburg (German) cylinder presses; Albert (German) cylinder press; Marinoni (French) duplex cylinder press; Albert (German) offset press; two Voirin (French) stone lithographing presses; three Cross automatic feeders; eight Fenix (German) platen presses; four Rockstroh & Schneider (German) platen presses; one Seybold, one Oswego, and three Krause (German) cutting machines; three French pen ruling machines; four German disk ruling machines; Marinoni (French) varnishing machine; five Krause (German) stamping presses; two Brehmer (German) folding machines; two Brehmer (German) stitching machines; Boston stitching machine; Smythe book-sewing machine; Brehmer (German) book-sewing machine; five Revasse (French) pedal numbering machines; three German pedal perforating machines; small envelope machine; three Mergenthalers; photo-engraving, stereotyping, and electrotyping machinery.

Compañía General de Fósforos, Reducto 2778; lithographers, printers, manufacturers of playing cards and paper boxes. Equipment: Schmierss, Werner & Stein (German)

cylinder press; L. & M. (English) cylinder press; Augsburg (German) cylinder press; R. Hoe & Co. stone lithographing press; two German, one French, and one Italian stone lithographing press; two Seybold cutting machines; continuous varnishing machine manufactured in own shops; two Krause (German) calendering machines; two French rotary slitters for cutting playing cards; four Krause die-stamping machines.

Imprenta Nacional, Magallanes 964; Government Printing Office. Equipment: Voirin (French) lithographing press; Koenig & Bauer (German), Johannisberg (German), Schmierss, Werner & Stein (German), Marinoni (French), and Alauzet (French) cylinder presses (one each); two Faber (German), two Voirin (French), and one Alauzet (French) stone lithographing press; Marinoni (French) semi-duplex newspaper press; Alauzet (French) newspaper press; Voirin (French) gumming machine; Brehmer (German) folding machine; nine Brehmer (German) and one Boston stitching machine; four Krause (German) cutting machines.

A. Soury & Co., Rincon 549; printers, stationers, blank-book manufacturers, wholesale paper dealers. Equipment: Two Albert (German) cylinder presses; three Corona cylinder presses; three Falcon (English) automatic platen presses; three Fenix (German) platen presses; three Will (German) and one English pen-ruling machine; four Brissard (French) disk ruling machines; two Brehmer (German) book-sewing machines; two Krause (German) cutting machines.

Curiel & Co., 25 de Mayo 323; printers, lithographers, importers of paper. Equipment: Two Schmierss, Werner & Stein (German), one Voirin (French), one Koch (German), and one German stone lithographing press; two Marinoni (French) cylinder presses; seven German platen presses; two Mansfeld (German) cutting machines; Brehmer (German) stitching machine; bronzing machine.

Enrique Escalante, Reconquista 624; printer, lithographer, photo-engraver, importer of paper. Equipment: One Augusta (Italian) and one Schmierss, Werner & Stein (German) stone lithographing presses; Augusta (Italian), Augsburg (German), Albert (German), and Klein, Foster & Bohn (German) cylinder presses (one each); two Fenix (German) and one Chandler & Price platen presses; Brehmer (German) folding machine; Mansfeld (German) cutting machine; Brehmer (German) stitching machine; photo-engraving plant.

Peña Hermanos, Treinta y Tres 1468; printers, lithographers, importers of paper. Equipment: Alauzet (French) semiduplex cylinder press; Offenback (German) cylinder press; Barre (French), Marinoni (French), and Alauzet (French) stone lithographing presses (one each); Lhermite (French), Krause (German), and Mansfeld (German) cutting machines (one each); one French pen-ruling machine; one French stitching machine; four platen presses; one Monotype caster and two keyboards; three power perforating machines; two Taetsch (French) numbering machines.

José M. Blanco, Florida 1532; printer, publisher, importer of paper. Equipment: Marinoni (French) semi-duplex newspaper press with automatic feeder; two Voirin (French), two Augsburg (German), one Johannisberg (German), and one Mailänder (German) cylinder press; four platen presses; Brehmer (German) folding machine; two Brehmer (German) stitching machines; three Mergenthalers.

Santiago Pedrosa, Treinta y Tres 1429; printer, lithographer, importer of paper. Equipment: Two Faber (German), one Voirin (French), and one German stone lithographing press; five German platen presses; two Krause (German) cutting machines; Brehmer (German) stitching machine.

A. Blanc & Co., Treinta y Tres 1511; printers, stationers, blank-book manufacturers. Equipment: Three German cylinder presses; five German platen presses; Will (German) pen ruling machine; Krause (German) cutting machine.

Fernandez, Colombino y Artigas, Piedras 432; printers, lithographers, stationers, importers of paper. Equipment: Two Marinoni (French) cylinder presses; Albert (German) cylinder press; Faber (German) stone lithographing press; two Marinoni (French) and one Fenix (German) platen press; Barre (French) cutting machine; Brehmer (German) stitching machine; bronzing machine.

Guerra & Co., Piedras 440; lithographers, printers. Equipment: One Barre (French) and two Faber (German) stone lithographing presses; one Fenix (German) and one Marinoni (French) platen presses; Krause (German) cutting machine; bronzing machine.

Sans & Martinez, 25 de Agosto 327; printers. Equipment: Two Albert (German) cylinder presses; two German platen presses; Mansfeld (German) cutting machine; Mergenthaler.

Lagarmarsino Hermanos, Sarandi 427; printers. stationers. Equipment: One Augsburg (German) and one Voirin (French) cylinder press; one Fenix (German) and one Chandler & Price platen press; Mansfeld (German) cutting machine; pen ruling machine; Brehmer (German) stitching machine.

Alejandro Hareau, Sarandi 464; printer, lithographer. Equipment: One Voirin (French) and two Faber (German) stone lithographing presses; two Marinoni (French) and one Chandler & Price platen press; Krause (German) cutting machine; two Brehmer (German) stitching machines; varnishing machine.

Castelnuovo & Berchesi, Reconquista 634; printers. Equipment: One Albert (German) and one Voirin (French) cylinder press; one Voirin (French) and one Chandler & Price platen press; Brehmer (German) folding machine; Mansfeld (German) cutting machine; Brehmer (German) stitching machine.

Francisco Arduino, Cerrito 691; printer. Equipment: Two Voirin (French), one Augsburg (German), one Albert (German), and two Johannisberg (German) cylinder presses; one Voirin (French), one American, and two Fenix (German) platen presses; English folding machine; Mansfeld (German) cutting machine; Brehmer (German) stitching machine.

Raymund Jannsen & Co., Misiones 1332; printers, manufacturers of envelopes. Equipment: One Koenig & Bauer (German), one Albert (German), and one Marinoni (French) cylinder press; two German platen presses; Mansfeld (German) cutting machine; Brehmer (German) stitching machine; Schmidt envelope-making machine.

Arnoldi & Parodi, O. del Plata 1076; lithographers, printers. Equipment: Faber (German) stone lithographing press; one Chandler & Price and one German platen press; Mansfeld (German) cutting machine.

Benedetti Hermanos, Plaza Independencia 805; theatrical printers. Equipment: Two Johannisberg (German) cylinder presses; two German platen presses; Mansfeld (German) cutting machine.

E. Costa & Co., Buenos Aires 500; printers. Equipment: One Marinoni (French) and one Johannisberg (German) cylinder press; 2 German platen presses; Mansfeld (German) cutting machine.

Cayetano Devoto, Juncal 1433; printer. Equipment: Marinoni (French) cylinder press; four German platen presses; Mansfeld (German) cutting machine.

J. J. Dornaleche, Cerro Largo 783; printer, stationer. Equipment: Two Albert (German) cylinder presses; three German platen presses; pen-ruling machine; Krause (German) cutting machine.

Enrique Gaucher, Zabalda 1283; printer, manufacturer of blank books and paper boxes. Equipment: Two Will (German), one Förste & Tromm (German), and one Waite & Sheard (English) ruling machine; Brehmer (German) paper-box manufacturing machines; two German platen presses; two Krause (German) cutting machines.

Gregorio V. Marino, San Jose 938; printer, linotype composition for the trade. Equipment: Johannisberg (German) cylinder press; two Marinoni (French) and two German platen presses; French cutting machine; Brehmer (German) stitching machine; two Mergenthalers.

Mosca Hermanos, 18 de Julio 1574; printers, stationers, book dealers. Equipment: Two Chandler & Price platen presses; one Förste & Tromm (German) disk ruling machine and one pen ruling machine; Krause (German) cutting machine.

Miguel Ramos, Florida 1474; printer. Equipment: Marinoni (French) semi-duplex cylinder press; one Schelter & Giesecke (German) and one Marinoni (French) cylinder press; one Fenix (German) and one American Gordon platen press; French cutting machine; two Mergenthalers.

Juan V. Rodino, Rondeau 1466; printer. Equipment: Augsburg (German) cylinder press; one Fenix (German), one Chandler & Price, and one German platen press; Krause (German) cutting machine; Mergenthaler.

Pedro Urquiza, Andes 1483; printer. Equipment: Seven German platen presses; Krause (German) cutting machine.

Miguez, Duran & Co., Treinta y Tres 1421; printers, stationers. Equipment: Augsburg (German) cylinder press; three Fenix (German) platen presses; Will (German) ruling machine; two Krause (German) cutting machines; two Brehmer (German) stitching machines.

Ferrocarril Central Uruguay, offices at Central Railway Station, plant at Peñarol, 12 kilometers from Montevideo; private printing plant. Equipment: Two English cylinder presses; three English platen presses; Falcon (English) automatic platen press; pen ruling machine; cutting machine.

Asistencia Pública Nacional, Lotería de la Caridad. Equipment: English printing and numbering machine for lottery tickets; Faber (German) stone lithographing press; Marinoni (French) semi-duplex cylinder; two Chandler & Price platen presses; Krause (German) cutting machine; Brehmer (German) stitching machine.

Viuda de Francisco Bech, Rondeau 1602; printer, stationer, lithographer, dealer in cigarette paper. Equipment: One Voirin (French) and one German stone lithographing press; Fenix (German) platen press; Förste & Tromm (German) ruling machine; Krause (German) cutting machine; Brehmer (German) stitching machine.

Viuda e Hijos de Z. Tolosa, Justicia 2233; printers, manufacturers of almanacs. Equipment: One French and one German cylinder press; Chandler & Price platen press; Krause (German) cutting machine.

Viuda e Hijos de J. J. Schmidt, 18 de Julio 880; stationers, printers, manufacturers of blank books, dealers in paper. Equipment: Two German platen presses; Förste & Tromm (German) disk ruling machine; two English pen ruling machines; Krause (German) cutting machine.

Escuela Don Bosco of the Salesian Fathers, Maldonado 2123; printing trade school. Equipment: Marinoni (French) cylinder press; three platen presses; Krause (German) cutting machine.

Comini Hermanos, 18 de Julio 936; printers, stationers, importers of paper. Equipment: Cylinder press; two platen presses; Förste & Tromm (German) disk ruling machine; pen ruling machine; cutting machine.

Banco de la República, corner Cerrito and Zabala; private printing plant of the Bank of the Republic. Equipment: One Fenix (German), one Falcon (English), and one Victoria (German) platen press; Galle (French) cutting machine.

Chiodoni & Co., Soriano 1037; printers. Equipment: Augusta (Italian) cylinder press; platen press; Augusta (Italian) cutting machine.

Angel Lasagna, Piedras 490; printer. Equipment: Two Marinoni (French) cylinder presses; two platen presses; French cutting machine.

Iglesias Hermanos, Agraciada 2097; printers. Equipment: Johannisberg (German) cylinder press; two Fenix (German) platen presses; Mansfeld (German) cutting machine.

Francisco Oliveras, 18 de Julio 1071; stationer, printer, manufacturer of blank books, importer of paper. Equipment: Two platen presses; two pen ruling machines; cutting machine.

Granero & Baston, Minas 1326; printers. Equipment: Three Victoria (German) platen presses; Chandler & Price platen press; Mansfeld (German) cutting machine.

SMALLER PRINTERS, MONTEVIDEO.

Lorenzo Adroher, Cerrito 750; Domingo Alonso, Cuareim 1425; Alvarez Hermanos, J. Maria 1379; José F. Arenas, Colonia 1458; O. M. Bertani, Reconquista 197; Manuel Boscano, Ituzaingo 1542; A. Brignole, Misiones 1538; Ramon Chas, Cont. Agrac 136d; Evelino Dacal, G. Flores 2229; Casòni dal Monte, Florida 1217; Navarro Fernandez, Mercedes 1013; Cesar Finochietti, 18 de Julio 1605; Freire & Co., San Jose 923; Pedro Lacousatte, Reducto 2683; Manuel Lopez, Yi 1491; Juan A. Machado, Canelones 1706; Morales Hermanos, B. Mitre 1514; Manuel Mosteiro, G. Flores 2414; Arturo Navas J. & E. Pedrales, Maldonado 815; Francisco Perciavalle, Cerrito 640; Carlos Quagliotti, Agraciada 2057; José M. Rimsky, Plaza Independencia 826; Alberto Sempol, Rio Negro 1670; Suc. A. Pedralbes, Rio Negro 1574; Pedro A. Urquiza, Andes 1483; Villaverde Hermanos, Misiones 1533; Domingo Zunino, Florida 1523.

PRINTERS ON TIN, MONTEVIDEO.

F. M. Defazio, Nueva Palmira 1834.
E. Vignole y hijos, Uruguay 1379.
P. Riocco é hijos, Vecinal 912.

MANUFACTURERS OF PAPER AND CARDBOARD, MONTEVIDEO.

Fábrica Nacional de Papel, S. A., Colonia 1222; mill at Puerto de Saucé, on River Plate; two machines; manufacturers of all grades of paper and cardboard.

Ricardo Algorta, Solis 1437; manufacturer of gray cardboard.

Bendahan y Co., Uruguay 1134; manufacturers of gray cardboard.

MANUFACTURERS OF BLANK BOOKS, MONTEVIDEO.

A. Soury & Co., Rincon 549.
Barreiro & Co., 25 de Mayo 604.
Blanc & Co., Treinta y Tres 1511.
Comini Hermanos, 18 de Julio 936.
Viuda y Hijos de J. J. Schmidt, 18 de Julio 880.
Mosca Hermanos, 18 de Julio 1574.
Enrique Haucher, Zabalda 1283.
Miguez, Duran & Co., Treinta y Tres 1421.
Juan J. Dornaleche, Cerro Largo 783.

MANUFACTURERS OF ENVELOPES, MONTEVIDEO.

Raymund Jannsen & Co., Misiones 1332.
Barreiro & Co., 25 de Mayo 604.

MANUFACTURERS OF PLAYING CARDS, MONTEVIDEO.

Compañía General de Fósforos, Reducto 2778.

MANUFACTURERS OF PAPER BOXES, MONTEVIDEO.

Pedro Amapani, Soriano 1340.
Juan Codina, Santa Fe 1160.
Arturo A. Corbi, P. Vieja 1384.
Emilio Fontán, Durazno 1429.
Frattini & Co., Colon 1458.
Emilio Gaucher, Zabalda 1283.
Ramón Magarinos. Colonia 914.
Angel Perrone, Rio Negro 1093.
José Rial, San José 924.
Juan Rubiales, Santa Fe 1229.
Alfonso Tella, Rondeau 1430.
Zapeterna y Lluch, Justicia 2158, Canelones 780.

PARAGUAY.

NEWSPAPERS AND STATED PUBLICATIONS IN ASUNCION.

La Tribuna, Palmas 425; afternoon daily; established 1915; 8 pages, 16 by 22 inches; circulation, 3,500. Equipment: Augsburg (German) cylinder press; Mergenthaler; three typographs (German). Foreign subscription price, $12 per annum; advertising rates, $2.50 per inch per month.

El Diario, Estrella 352; afternoon daily; established 1904; 6 pages, 16 by 22 inches; circulation, 3,000. Equipment: Augsburg (German) cylinder press; two Mergenthalers. Foreign subscription price, $10 per annum; advertising rates, $2.75 per inch per month.

El Liberal, Palma 281; afternoon daily; established 1912; 8 pages, 14½ by 20½ inches; circulation, 2,000. Equipment: Marinoni (French) cylinder press. Foreign subscription price, $10 per annum; advertising rates, $2.50 per inch per month.

Los Principios, Libertad 47; afternoon daily; established 1908; 4 pages, 16 by 23 inches; circulation, 1,000. Equipment: Marinoni (French) cylinder press. Foreign subscription price, $12 per annum; advertising rates, $2 per inch per month.

El Nacional, Villarica 211; afternoon daily; established 1916; 6 pages, 16 by 23 inches; circulation, 1,000. Equipment: Marinoni (French) cylinder press. Foreign subscription price, $10 per annum; advertising rates, $2 per inch per month.

Patria, Alberti 214; afternoon daily; established 1916; 4 pages, 17¾ by 26 inches; circulation, 1,000. Equipment: Marinoni (French) cylinder press. Foreign subscription price, $10 per annum; advertising rates, $1.50 per inch per month.

Comuneros, Benjamin Constant 180; afternoon daily; established 1917; 4 pages, 14 by 20½ inches; circulation, 1,000. Foreign subscription price, $10 per annum; advertising rates, $1.50 per inch per month.

El Noticiero Alemán, Independencia Nacional 275; biweekly in Spanish and German; 8 pages, 9 by 12½ inches; circulation, 1,000. Local subscription price, $2 per annum; printed by H. Krause.

Revista del Comercio, Palma 182; bimonthly bulletin of the Chamber of Commerce; established 1911; 16 pages, 9¾ by 12½ inches; circulation, 1,500. Foreign subscription price, $2 per annum.

El Economista Paraguayo, Avenida Pettirossi (Villa Ñanduti); weekly commercial journal; established 1909; 8 pages, 9 by 12½ inches; circulation, 1,000. Foreign subscription price, $4 per annum; advertising rates, $0.62½ per inch per month.

Other publications in Asuncion: Prometeo, Ayolas, esq. Jejui; El Radical; El Bien.

NEWSPAPERS OUTSIDE OF ASUNCION.

Concepcion: El Municipio (weekly); El Mensajero (weekly).

Encarnacion: El Imparcial (weekly); La Voz del Interior (weekly); El Patriota (weekly).

Ita: El Itaño (weekly).

Luque: La Juventud (weekly).
Paranguari: El Progreso (weekly).
Pirayu: General Diaz (weekly).
Villa Rica: El Cívico (weekly); El Orden (weekly); El Progreso (weekly).

PRINTING AND LITHOGRAPHING ESTABLISHMENTS IN ASUNCION.

H. Kraus, Villarica esq. 15 de Agosto; printer and lithographer. Equipment: Augsburg (German) cylinder press; two German stone lithographing presses; six Liberty platen presses; Victoria (German) platen press; Förste & Tromm (German) disk ruling machine; two Brehmer (German) book-stitching machines; two Krause (German) cutting machines; Krause (German) die-stamping press; three foot perforating machines; German envelope-making machine; pedal numbering machine; small stereotyping outfit.

Félix Daumas Ladouce, Ayolas 131; printer and binder. Equipment: Three Marinoni (French) cylinder presses; Angel Estrada (Argentine) cylinder press; Rockstroh & Schneider (German) platen press; two Diamante (German), one Brilliant (German), one Liberty, one Boston, and one Rapid job press; Förste & Tromm (German) disk ruling machine; two Brehmer (German) stitching machines; three Krause (German) cutting machines; photo-engraving and stereotyping plants.

Zamphiropolis & Co., Villarica esq. Convención; printers and publishers. Equipment: Koenig & Bauer (German) cylinder press; Ideale, Victoria, Exito, and Rapid platen presses (one of each); Krause (German) die-stamping press; Krause (German) cutting machine; pen ruling machine; pedal perforating machine; small stereotyping outfit.

Talleres Gráficos del Estado; Government Printing Office. Equipment: Two Marinoni (French) cylinder presses; Faber (German) stone lithographing press; one Liberty, one Exito, two Ideale, and one Diamante platen press; Krause (German) cutting machine; three Brehmer (German) book-sewing machines; Brehmer (German) wire-stitching machine; two pedal perforating machines.

J. M. Duarte & Co., Estrella 402; printers and stationers. Equipment: Augsburg (German) cylinder press; Chandler & Price, Victoria, and Minerva platen presses (one of each); Waite & Sheard (English) ruling machine; Krause (German) cutting machine.

Russo, Machain & Co., 25 de Noviembre y 6a Proyectada; printers and manufacturers of matches and playing cards. Equipment: German stone lithographing press; two German platen presses; Krause (German) cutting machine.

Smaller printers of Asuncion: Benedetti & Co., Ortiz Cusso, Quell y Carron, and Felix Trujillo.

CARDBOARD-BOX MAKERS.

Ramon Piera.
Juan Planas.

MANUFACTURERS OF PLAYING CARDS.

Russo, Machain & Co., 25 de Noviembre esq. 6a Proyectada.

Appendix B.—SAMPLES AND EXHIBITS.

ARGENTINA.

The following samples and exhibits have been forwarded to the New York district office of the Bureau of Foreign and Domestic Commerce (United States Customhouse), where they are open to inspection by all interested persons.

SAMPLES.

1. Wood pulp, manufactured by El Fenix Fábrica de Papel, Campaña, for its own use from willow trees.
2. Nineteen varieties of wrapping paper, manufactured by Compañía General de Fósforos, Buenos Aires; prices from $0.096 to $0.116 per pound.
3. Twenty-four varieties of wrapping paper manufactured by Fábrica de Papel Casate, San Nicolas; prices from $0.077 to $0.116 per pound.
4. Twenty-two varieties of wrapping paper, manufactured by La Argentina Fábrica de Papel, Zarate; prices from $0.077 to $0.116 per pound.
5. Thirty-eight varieties of wrapping paper, manufactured in Argentina by local mills and sold by José Iturrat, Buenos Aires; cheapest grades manufactured by Iturrat, Manaserro & Co., Andino.
6. Bogus wrapping paper, manufactured by all local mills; price, $0.077 per pound.
7. Parchment paper manufactured by La Argentina Fábrica de Papel, Zarate; price, $0.174 per pound.
8. Glassine paper, imported from Sweden; price, September, 1915, £42 per 1,000 kilos, c. i. f. Buenos Aires ($0.094 per pound); July, 1917, £118 per 1,000 kilos, f. o. b. London ($0.26 per pound).
9. Twelve varieties of colored poster, manufactured by all local mills and sold by Ault & Wiborg; price, $0.158 per pound.
10. Forty-five varieties of combined writing and printing paper, manufactured by Compañía General de Fósforos; price, $0.158 per pound.
11. Nineteen varieties of combined writing and printing paper (second quality), manufactured by Compañía General de Fósforos; price, $0.149 per pound.
12. Combined writing and printing paper, manufactured by La Argentina Fábrica de Papel; price, $0.158 per pound.
13. Combined writing and printing paper (second quality), manufactured by La Argentina Fábrica de Papel; price, $0.149 per pound.
14. News print, imported from Norway; price, $0.088 per pound, delivered in Buenos Aires.
15. Fifty-three varieties of combined writing and printing paper, sold by Gilchrist & Co., Buenos Aires.
16. Visiting and business cards, manufactured by La Argentina Fábrica de Papel and sold by Gilchrist & Co.; prices as shown on samples.
17. Coated book paper, imported from England by Gilchrist & Co.
18. Thirty-four varieties of colored poster paper, manufactured by La Argentina Fábrica de Papel; price, $0.158 per pound.
19. Three varieties of ruled writing paper, imported from the United States and England and sold by Gilchrist & Co.; price on each sample.
20. Seven varieties of linen writing paper, imported from England and sold by Gilchrist & Co.; price as shown on samples.
21. Twelve varieties of sulphite bond, imported from the United States and sold by Gilchrist & Co.; price as shown on samples.
22. Nine varieties of blotting paper, imported from the United States and sold by Gilchrist & Co.
23. Twenty-five varieties of cardboard, sold by Gilchrist & Co.
24. Twenty varieties of sulphite bonds, imported and sold by Curt Berger & Co.; price, July, 1915, $0.092 per pound; July, 1917, $0.20 per pound.
25. News print, imported from Norway; price as shown on sample.
26. Eleven varieties of supercoated cover paper, manufactured by La Argentina Fábrica de Papel; price, January, 1914, $0.086 per pound.

27. Twelve varieties of cardboard sold by Curt Berger & Co.; price, July, 1914, $0.086 per pound.

28. Eight varieties of colored tissue paper, manufactured by local mills; price, $0.153 per pound.

29. Eight varieties of coated cover paper, manufactured by La Argentina Fábrica de Papel; price, $0.145 per pound.

30. Fourteen varieties of blotting paper, imported and sold by Curt Berger & Co. prices as shown on samples.

31. Nine varieties of bristol board, imported and sold by Curt Berger & Co.; price, August, 1913, $0.109 per pound.

32. Two varieties of paper sacks, manufactured by all local paper mills; price, $0.087 per pound.

33. Six varieties of gray and brown cardboard, manufactured by Compañía General de Fósforos; price for gray board, $0.052 per pound; for brown board, $0.054 per pound.

34. Nine varieties of gray cardboard, manufactured by Gilchrist & Co.; price, $0.052 per pound.

35. Thirty-six varieties of leatherboard, strawboard, and pulpboard, imported from Norway; price as shown on samples.

36. One hundred and twenty-one varieties of wall paper, imported from Germany; prices from $0.0285 to $0.0475 per roll, f. o. b. Hamburg.

37. Fourteen varieties of wall paper, imported from Germany; prices from $0.0285 to $0.04 per roll, f. o. b. Hamburg.

38. Two popular designs of wall paper, imported from Great Britain; price, $0.16 per roll, f. o. b. London.

39. Two popular designs of wall paper, imported from Great Britain; price, $0.40 per roll, f. o. b. London.

40. Papeterie containing 50 sheets of paper and 50 envelopes, imported from France; price, $0.34 per box.

41. Papeterie containing 50 cards and envelopes, imported from France; price, $0.22 per box.

42. Papeterie containing 25 sheets of paper and 25 envelopes, imported from France; factory price, $0.256.

43. Papeterie containing 25 sheets of paper and 25 envelopes, imported from France; factory price, $0.30.

44. Thirteen sizes of grocery sacks, manufactured in Argentina; price as shown on each size, in Argentine silver pesos.

45. Two varieties of fancy confectioner's sacks, made in Argentina; similar to grades formerly imported from Germany.

46. Two varieties of wall paper used by Piccardo & Co., cigarette manufacturers, for advertising purposes.

47. Twenty-two varieties of envelopes, manufactured in Argentina; price as shown on each sample, in Argentine silver pesos.

48. Papeterie containing 25 envelopes and 25 sheets of paper, manufactured in Argentina from imported paper and envelopes.

49. Handmade paper, imported from Spain; used by the Government for all legal documents.

50. Blank book, manufactured in Argentina; prices of various sizes shown in each book.

51. Blank book, manufactured in Argentina; prices of various sizes shown in each book.

52. Blank book, manufactured in Argentina; prices of various sizes shown in each book.

53. Blank book, manufactured in Argentina; prices of various sizes shown in each book.

54. Blank book, manufactured in Argentina; prices of various sizes shown in each book.

55. Blank book, manufactured in Argentina; prices of various sizes shown in each book.

56. Blank book, manufactured in Argentina; prices of various sizes shown in each book.

57. Press copy book, letter size, imported from Italy; cost, June, 1914, $0.30 each, f. o. b. factory.

58. Two varieties of ivory board, imported from Germany; price, $0.052 per pound.

59. Ivory board, imported from Germany; price, $0.081 per pound.

60. Six varieties of colored bristol board, manufactured by La Argentina Fábrica de Papel; price, $0.14 per pound.

61. Three varieties of bristol board, manufactured by La Argentina Fábrica de Papel; price, $0.145 per pound.

62. Seven varieties of colored bristol board, imported from Austria; price, July, 1914, $0.068 per pound.

63. Bristol board, imported from Germany; prices, May, 1914, from $0.047 to $0.0595 per pound.

64. Samples of grease-proof paper, imported from France.

65. Sample of playing cards, manufactured by Compañía General de Fósforos, Buenos Aires; retail price, 60 paper centavos ($0.26) per pack.

66. Samples of carbon paper, manufactured by H. Pessina, Buenos Aires; wholesale price, $2.50 paper pesos ($1.06) per box of 100 sheets, letter size.

SAMPLES OF NEWSPAPERS AND MAGAZINES.

Sample copies of all the important newspapers and magazines published in Buenos Aires and Rosario have been forwarded to the New York district office of the Bureau of Foreign and Domestic Commerce (United States Customhouse), where they can be inspected by interested persons.

EXHIBITS.

1. Typewritten copy of report made by engineers of the Argentine Department of Agriculture on the manufacture of paper from materials to be obtained in the country.

2. Typewritten copy of report made by Engineer J. M. Huego of the Department of Agriculture to the Secretary of Agriculture on the materials to be found in Argentina suitable for the manufacture of paper.

3. Copy of "Los Bosques Patagónicos," by Max Rothkugel, issued by the Argentine Department of Agriculture and containing descriptions of the forests in the southern part of the country, with data regarding the woods suitable for the manufacture of pulp for paper making.

4. Copy of "Anales Gráficos," published by the Instituto Argentino de Artes Gráficas, and describing the graphic arts exposition held in Buenos Aires in 1916.

5. Report of the Director of the National Penitentiary of Argentina for 1916, describing the operations of the printing and lithographing departments of that institution.

6. Report of the Director of the Casa de Moneda (National Mint), describing the operation of that institution for the year 1915.

7. Book describing the plant of La Prensa, daily newspaper of Buenos Aires.

8. Book describing the plant of Suc. de Ricardo Radaelli, printers and lithographers, Buenos Aires.

9. Three copies of "Anales Gráficos," published by the Instituto de Artes Gráficas de Buenos Aires.

10. Booklet describing the printing plant and paper mill of the Compañía General de Fósforos, Buenos Aires.

11. Booklet describing the plant of La Razón, daily newspaper, Buenos Aires.

12. 1917 almanac of La Razón, daily newspaper of Buenos Aires.

13. Catalogue of books published and imported by Angel Estrada & Co., Bolivar 466, Buenos Aires.

14. Catalogue of books imported and published by J. Lajouane & Co., Bolivar 270, Buenos Aires.

15. Catalogue of stationery sold by Angel Estrada & Co., Buenos Aires.

16. Catalogue of school supplies imported by Angel Estrada & Co., Buenos Aires.

17. Advertising rate cards of the following publications: La Prensa, Buenos Aires; La Nación, Buenos Aires; La Razón, Buenos Aires; El Diario, Buenos Aires; La Vanguardia, Buenos Aires; The Standard, Buenos Aires; La Patria degli Italiani, Buenos Aires; Il Roma, Buenos Aires; El Nacional, Buenos Aires; Los Sucesos, Buenos Aires; El Avisador Mercantil, Buenos Aires; España Nueva, Buenos Aires; Vida Porteña, Buenos Aires; El Hogar, Buenos Aires; Vida Española, Buenos Aires; El Cronista Comercial, Buenos Aires; La Ingeniería, Buenos Aires; La Mañana, Buenos Aires; Mundo Argentino, Buenos Aires; Tit-Bits, Buenos Aires; Caras y Caretas, Buenos Aires; Review of the River Plate, Buenos Aires; The Times of Argentina, Buenos Aires; Fray Mocho, Buenos Aires; El Resumen, Buenos Aires; Revista Técnica, Buenos Aires; Arquitectura, Buenos Aires; Plus Ultra, Buenos Aires; Gaceta Rural, Buenos Aires; P. B. T., Buenos Aires.

18. Balance sheet of La Argentina (S. A.) para la Fabricación de Papel, February 28, 1916.

19. Scale of wages of printers in Buenos Aires.

20. Guide to the newspapers and publications of Argentina, 1913.

21. Statistics for 1915 showing paper imports.
22. Bulletin giving preliminary statistics for 1916.
23. Sample of specification issued by Argentine Government when asking for bids on paper.
24. Book issued by Casa Jacobo Peuser on occasion of its fiftieth anniversary, showing views of plant and samples of work.
25. Prospectus of company to manufacture sandpaper in Argentina.
26. Samples of advertising matter used by dealers in roofing paper.

PHOTOGRAPHS.

1. Beaters, Compañía General de Fósforos, paper mill, Bernal, Argentina.
2. Fourdrinier machines, Compañía General de Fósforos, paper mill, Bernal, Argentina.
3. Calender machines, Compañía General de Fósforos, paper mill, Bernal, Argentina.
4. Cutting machines, Compañía General de Fósforos, paper mill, Bernal, Argentina.
5. Inspection room, Compañía General de Fósforos, paper mill, Bernal, Argentina.
6. Power plant, Compañía General de Fósforos, paper mill, Bernal, Argentina.
7. Lithographing presses, Compañía General de Fósforos, printing plant, Buenos Aires.
8. Typographic cylinder presses, Compañía General de Fósforos, printing plant, Buenos Aires.
9. Platen presses, Compañía General de Fósforos, printing plant, Buenos Aires.
10. Lithographic transfer section, Compañía General de Fósforos, printing plant, Buenos Aires.
11. Bindery, Compañía General de Fósforos, printing plant, Buenos Aires.
12. Blank-book section, Compañía General de Fósforos, printing plant, Buenos Aires.
13. Typographic presses, Compañía General de Fósforos, printing plant, Montevideo, Uruguay.
14. Lithographing presses, Compañía General de Fósforos, Montevideo, Uruguay.
15. Exhibit of Compañía General de Fósforos, of Buenos Aires, at the Panama-Pacific Exposition, San Francisco.
16. Building of the Compañía General de Fósforos at the Industrial Exposition, Buenos Aires, 1910.
17. Magazine presses, Suc. de Ricardo Radaelli, Buenos Aires.
18. Typographic cylinder presses, Suc. de Ricardo Radaelli, Buenos Aires.
19. Lithographic presses, Suc. de Ricardo Radaelli, Buenos Aires.
20. Building occupied by printing plant of Suc. de Ricardo Radaelli, Buenos Aires.
21. Building of La Prensa, Buenos Aires.
22. Pressroom, La Prensa, Buenos Aires.
23. Mailing room, La Prensa, Buenos Aires.
24. Linotype room, La Prensa, Buenos Aires.
25. Make-up room, La Prensa, Buenos Aires.
26. Matrix presses, La Prensa, Buenos Aires.
27. Waiting room to general manager's office, La Prensa, Buenos Aires.
28. General manager's office, La Prensa, Buenos Aires.
29. Editor's office, La Prensa, Buenos Aires.
30. Reporters' room, La Prensa, Buenos Aires.
31. File room, La Prensa, Buenos Aires.
32. Fencing room for use of staff, La Prensa, Buenos Aires.
33. Library, La Prensa, Buenos Aires.
34. Hall for public meetings, La Prensa, Buenos Aires.
35. Consultation room, free medical department, La Prensa, Buenos Aires.
36. Employees' dining room, La Prensa, Buenos Aires.
37. Building of La Nación, Buenos Aires.
38. Business office, La Nación, Buenos Aires.
39. Entrance to building, La Nación, Buenos Aires.
40. Salesroom of publications of La Nación, Buenos Aires.
41. Marinoni (French) press used by La Nación, Buenos Aires.
42. Second Marinoni (French) press used by La Nación, Buenos Aires.
43. View of composing room, La Nación, Buenos Aires.
44. Partial view of linotype room of La Nación, Buenos Aires.
45. Matrix presses, La Nación, Buenos Aires.
46. Building of El Diario, Buenos Aires.
47. Folder end of Goss press, El Diario, Buenos Aires.
48. Linotype room, El Diario, Buenos Aires.
49. View of composing room, El Diario, Buenos Aires.
50. Make-up tables, El Diario, Buenos Aires.

51. Stereotyping room, El Diario, Buenos Aires.
52. Photographing department, El Diario, Buenos Aires.
53. Artists' room, El Diario, Buenos Aires.
54. Library, El Diario, Buenos Aires.
55. Building of Caras y Caretas, weekly magazine, Buenos Aires.
56. Employees of Caras y Caretas, weekly magazine, Buenos Aires.
57. Entrance hall, Caras y Caretas, weekly magazine, Buenos Aires.
58. Manager's office, Caras y Caretas, weekly magazine, Buenos Aires.
59. Business office, Caras y Caretas, weekly magazine, Buenos Aires.
60. Advertising composing room, Caras y Caretas, weekly magazine, Buenos Aires.
61. Monotype keyboards, Caras y Caretas, weekly magazine, Buenos Aires.
62. Monotype casters, Caras y Caretas, weekly magazine, Buenos Aires.
63. Photograph gallery, Caras y Caretas, weekly magazine, Buenos Aires.
64. Artists' room, Caras y Caretas, weekly magazine, Buenos Aires.
65. German rotary magazine presses used by Caras y Caretas, weekly magazine, Buenos Aires.
66. German four-color rotary magazine press, used by Caras y Caretas, weekly magazine, Buenos Aires.
67. One of the two automatic gathering, stitching, and pasting machines used by Caras y Caretas, Buenos Aires.
68. Krause (German) continuous cutting machines, used by Caras y Caretas, weekly magazine, Buenos Aires.
69. Ink grinders, used by Caras y Caretas, weekly magazine, Buenos Aires.
70. Auxiliary power plant, Caras y Caretas, weekly magazine, Buenos Aires.

URUGUAY.

SAMPLES.

1. Samples of all papers manufactured by the Fábrica Nacional de Papel.
2. Official stamped paper purchased by the Uruguayan Government and sold for all legal documents; annual consumption 2,000 reams of 500 sheets.
3. Two grades of playing cards manufactured by the Compañía General de Fósforos, Montevideo; packs containing 40 cards, wholesale price $11.50 per gross; packs containing 48 cards, wholesale price $13.50 per gross.

Montevideo newspapers: El Día, El Plata, La Razón, Tribuna Popular, El Siglo, Diario del Plata, El Telégrafo, La Mañana, El Pueblo, Vida Americana, El Economista Uruguayo, Selecta, Uruguay Weekly News, La Verdad, La Revista Blanca, La Democracia, El Diario Español, El Bien, La Defensa Comercial, Montevideo Times, Diario Oficial, El Debate, Uruguay Sport, El Amigo del Obrero, El Estanciero, El Hacendado, Arquitectura, Minerva, El Noticiero, La Campaña, Cinema, La Causa Rural, Federación Rural.

EXHIBITS.

1. Advertising rate cards of the following Montevideo publications: El Día, La Democracia, El Estanciero, El Bien, Diario del Plata, El Plata, El Siglo, La Razón, El Telégrafo.
2. Descriptive booklet showing views of plant of Barreiro & Co., printers and stationers, Montevideo.

PARAGUAY.

SAMPLES.

1. Wrapping paper, used principally in Paraguay (two sizes); imported from Italy; packed in bales containing 1,200 sheets each, size of sample, weighing 3½ kilos (7.8 pounds) and 6 kilos (13.2 pounds), respectively; cost per bale, 1914, large size 2.20 lire ($0.424), small size 1.50 lire ($0.29), f. o. b. Italian port; cost, 1917, about 75 per cent higher; retail price per bale, 1914, large size $1.25, small size $0.80; retail price, 1917, large size $2, small size $1.50.
2. Bogus wrapping paper, largely used in Paraguay; imported from Italy and Spain; packed in bales containing 1,200 sheets to a bale, weighing 6 kilos (13.2 pounds) and 9.3 kilos (20.5 pounds), respectively; cost per bale, 1914, large size $0.615, small size $0.462, f. o. b. European port; retail price, large size $1.95 per bale, small size $1.28 per bale.
3. Wrapping paper, manufactured by A. Zwanenburg & Co., Amsterdam; cost, March, 1917, 38.75 florins per 100 kilos ($0.07 per pound), f. o. b. Amsterdam.

4. Imitation kraft wrapping paper, manufactured by A. Zwanenburg & Co., Amsterdam; cost, March, 1917, 29.25 florins per 100 kilos ($0.05 per pound), f. o. b. Amsterdam.
5. Official stamped paper sold by the Paraguayan Government; manufactured in Germany; annual consumption about 400,000 sheets.
6. "Mi Primer Libro," primary reader used in the public schools; 1914 edition, printed in Germany, cost about $0.11 each, f. o. b. Asuncion; 1916 edition (50,000 copies), printed in Buenos Aires, cost $0.265 each, f. o. b. Asuncion.
7. "Geografía de la República del Paraguay"; primary geography used in the public schools; printed in Germany.

SAMPLES OF NEWSPAPERS.

Asuncion: La Tribuna, El Diario, El Liberal, El Nacional, Los Principios, Patria, Comuneros, El Noticiero Alemán, Revista del Comercio, El Economista Paraguayo, Prometeo, El Radical, El Bien.

Encarnacion: El Patriota, La Voz del Interior, El Imparcial.

EXHIBITS.

1. File containing 39 copies of Revista del Comercio, official publication of the Chamber of Commerce, Asuncion, Paraguay, January 1, 1916, to August 1, 1917.
2. "La República del Paraguay en su Primer Centenario"; Buenos Aires, 1911; illustrated book describing progress of Paraguay.
3. "El Paraguay Moderno"; Asuncion, 1915; illustrated book describing progress of Paraguay.
4. "Paraguay MCMX"; Asuncion, 1915; illustrated book issued by Banco Agrícola, Asuncion, describing progress of Paraguay.
5. "Paraguay," by W. Jaime Molins; second edition, Buenos Aires, 1916.
6. "Guia General del Paraguay;" Asuncion, 1916; commercial directory and guidebook of Paraguay.
7. "Anuario Estadístico de la República del Paraguay 1914"; Asuncion, 1915; official statistical publication of Paraguayan Government for 1914.
8. "Anuario Estadístico de la República del Paraguay 1915"; Asuncion, 1916; official statistical publication of Paraguayan Government for 1915.
9. "Compendio de Historia de Paraguay," by Teran y Gamba, corrected and augmented by Hector F. Decoud; Asuncion, 1914; brief history of Paraguay.
10. Memoria del Banco Agrícola del Paraguay, 1909-10; Asuncion, 1911; report of the Banco Agrícola, 1909-10.
11. Inaugural address of President Manuel Franco before Paraguayan Congress, August 15, 1916; Asuncion, 1916.
12. Message of President Schaerer to Paraguayan Congress, April, 1916; Asuncion, 1916.
13. Message of President Franco to Paraguayan Congress, April, 1917; Asuncion, 1917.
14. Censo Electoral; official returns of congressional elections, March 4, 1917; Asuncion, 1917.
15. "Breve Resumen de la Historia del Paraguay"; Asuncion, 1897; brief history of Paraguay.
16. "Metodo Practico para Aprender la Lengua Guarani"; Asuncion, 1907; practical method for learning the Guarani language.
17. Proof sheets of portion of Anuario Estadístico for 1916, showing official statistics of importation and exportation for 1916.
18. Bulletin of the Dirección General de Estadística, showing official statistics of importation and exportation for January, February, and March, 1917.
19. Copy of Revista del Comercio, August 15, 1917, showing statistics of importation and exportation for first six months of 1917.
20. "Leyes de Moriatorias"; collection of laws relative to moratoria adopted by the Paraguayan Congress in 1914, 1915, and 1916.

NOTE.—Lists of dealers in paper, paper products, and printing machinery in the countries covered by this monograph were submitted by Special Agent Robert S. Barrett and may be obtained from the Bureau of Foreign and Domestic Commerce or its district or cooperative offices. Inquirers should refer to the file numbers, as follows: Argentina, 1234; Uruguay, 1323; Paraguay, 1292.

RECENT PUBLICATIONS ON PAPER AND PRINTING MACHINERY.

The Bureau of Foreign and Domestic Commerce has recently issued the following monographs on paper and printing machinery, which may be obtained for the stated prices from the district offices of the Bureau or from the Superintendent of Documents, Government Printing Office, Washington, D. C.:

Paper and Stationery Trade of the World. Compiled from consular reports by Grosvenor Dawe. Special consular reports No. 73; 1915; 458 pages. Price, 50 cents.

Paper, Paper Products, and Printing Machinery in Cuba and Panama, by R. S. Barrett. Special agents series No. 132; 1917; 44 pages. Price, 5 cents.

Paper, Paper Products, and Printing Machinery in Peru, Bolivia, and Ecuador, by R. S. Barrett. Special agents series No. 143; 1917; 77 pages. Price, 10 cents.

Chilean Market for Paper, Paper Products, and Printing Machinery, by R. S. Barrett. Special agents series No. 153; 1917; 72 pages. Price, 15 cents.

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DEPARTMENT OF COMMERCE
BUREAU OF FOREIGN AND DOMESTIC COMMERCE
B. S. CUTLER, Chief

SPECIAL AGENTS SERIES—No. 164

TEXTILE MARKET OF CHILE

BY

W. A. TUCKER
Special Agent

PRICE, 10 CENTS
Sold by the Superintendent of Documents, Government Printing Office
Washington, D. C.

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1918

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LETTER OF SUBMITTAL.

DEPARTMENT OF COMMERCE,
BUREAU OF FOREIGN AND DOMESTIC COMMERCE,
Washington, March 15, 1918.

SIR: There is submitted herewith a report by Special Agent W. A. Tucker reviewing the textile trade of Chile. The report discusses the normal market for cotton, silk, wool, linen, and jute and hemp goods and the normal sources of supply, the advantage held by the United States under war conditions, and the methods by which this advantage may be turned to account upon the conclusion of peace. Special sections are devoted to the textile manufacturing industry of Chile, local factors affecting trade, and various general matters connected with successful merchandising in the Chilean market.

Respectfully,

B. S. CUTLER,
Chief of Bureau.

To Hon. WILLIAM C. REDFIELD,
Secretary of Commerce.

TEXTILE MARKET OF CHILE.

INTRODUCTION.

The Republic of Chile comprises a long, narrow strip of land between the Andes Mountains and the Pacific, extending from 17° 10′ south latitude to parallel 56 (about 2,700 miles) and varying from 106 to 225 miles in greatest width. In the northern part of the country is the nitrate region—barren pampas traversed by volcanic hills—extending south to about the port of Coquimbo. This section is extremely dry, with few rivers and practically no rain, has no agriculture, and is valuable only because of the immense deposits of nitrogen salts, a quantity estimated to be sufficient to supply the entire world for 150 years. These deposits form the principal source of wealth of the country, the income from the export duties on nitrate of soda and iodine amounting to nearly twice as much as the total import duties. The central section of Chile, extending from Coquimbo almost to Concepcion, is the most thickly populated and the most important commercially and industrially. It contains the principal seaport, Valparaiso, and the capital, Santiago. The coast range in this section is broken by many valleys and deep canyons that traverse its entire width, but there are no important streams or inlets, and the ocean shows great depths a short distance from shore. Coquimbo, however, is on a bay and has a well-protected harbor. In southern Chile are the great grain and pasture lands and the heavily wooded areas.

AREA AND POPULATION.

Chile has an area of 289,720 square miles and a population estimated in 1916 at 3,789,864, the most dense in the southern continent except Uruguay, the inhabitants averaging 13 per square mile. According to the census of 1907 there are about 100,000 more or less pure-blooded Indians in the Araucania region and a few hundred aboriginals in the vicinity of the Straits of Magellan, but these latter are rapidly disappearing. The greater part of the population is made up of Spaniards or people of Spanish origin, and there are a few Germans, French, Italians, and English, and a very few Americans. The census of 1907 shows that 43 per cent of the people live in villages or towns of over 1,000 inhabitants and that there were in the country 134,524 foreigners, made up as follows: Peruvians, 27,140; Bolivians, 21,968; Spaniards, 18,755; Italians, 13,023; Germans, 10,724; English, 9,845; French, 9,800; Argentinians, 6,956; Austrians, 3,813; Swiss, 2,080; Chinese, 1,920; Turks, 1,729; and Americans, 1,055.

Four-fifths of the entire population are found in the Provinces located between parallels 31 and 40° south, the deserts of the north and the rich territory of the south, not yet colonized, containing very few inhabitants. The geographical position of the country militates against any considerable immigration, the few persons that are brought in every year through the assistance of the Government usually finding their way to the higher wages of Argentina. Immigration has greatly declined during recent years owing to regulations that have been put into effect with the view of keeping out undesirables. Present laws require that only immigrants solicited by private parties may be brought to the country under proper guaranties, and that contracts must be signed before notaries. During 1913 the total immigration amounted to only 1,142. The total yearly increase in population is slight.

RESOURCES AND INDUSTRIES.

By far the most important of the resources of the country is the nitrate industry, the exports for the years 1913, 1914, and 1915 amounting to $111,454,397, $77,117,063, and $77,981,158, respectively. The next item in importance is copper, with exports amounting to $10,337,360, $10,914,543, and $15,148,879 for the three years. During 1914 the value of the principal exports, in order of importance, was as follows: Nitrates, $77,117,063; copper, $10,914,543; wool, $3,657,989; frozen meats, $1,907,862; barley, $1,677,078; oats, $1,160,993; iron ore, $797,045; beans, $604,432; nuts, $552,769; silver, $285,322; and wheat, $206,599. War conditions have worked great changes in the exports as well as in the imports, the exports of nitrates increasing 58 per cent, wool 87 per cent, wheat slightly more than 100 per cent, and copper 273 per cent, while exports of iron in 1916 fell to less than 15 per cent of the total for 1914. Mining leads all industries aside from nitrate, but cattle raising, wool growing, and agriculture are destined to become increasingly important factors in the wealth of the country.

Chile has made the greatest industrial progress of the west-coast countries and with additional capital would soon be practically independent of other sources of supply for nearly all its manufactures. Among the industries now in operation are shoe factories, paper mills, two woolen mills, two silk mills, three cotton-weaving mills, and several small knitting establishments for the manufacture of sweaters, hosiery, and underwear. There are several establishments for the manufacture of ready-to-wear clothing for men, women, and children; glass factories; furniture factories; iron and bronze foundries; locomotive repair shops; distilleries; breweries; tanneries; canning factories; cardboard mills; carriage factories; boiler shops; and numerous other industrial establishments. There is under construction at San Bernardo, a short distance from Santiago, a locomotive repair shop, fitted throughout with American machinery, that will be the last word in modern machine-shop equipment, and another shop for making locomotives will probably be erected in the near future. Plans are under way for the establishment of two more woolen mills, both to be equipped with American machinery.

SHIPPING FACILITIES.

Under normal conditions Chile enjoys excellent marine transportation service with neighboring countries, the United States, and the nations over seas. Under present conditions traffic with European ports is far from normal, some of the lines operating formerly maintaining no service whatever and others having irregular sailings. Communication with the United States is maintained by three American lines operating boats direct from New York and San Francisco to Chilean ports—the Merchants' Line, New York & South American Steamship Co., and Barber Line. There are also two lines operating between west-coast ports and Panama, maintaining weekly sailings and making connections with the several lines operating between that port and the Atlantic and Gulf ports of the United States. These are the Cia. Sud Americana de Vapores (Chilean Line) and the Cia. Peruana de Vapores y Dique de Callao (Peruvian Line), both subsidized by their respective Governments. Occasionally the Peruvian Line sends a boat direct to Baltimore. The principal English lines are the Pacific Steam Navigation Co., touching at the Pacific ports of both North and South America and occasionally sending a ship from west-coast ports to New York; the Lamport & Holt Line, and the Gulf Line. One Japanese line, the Toyo Kisen Kaisha, operates a service about once in two months between Japan and west-coast ports. This line also is subsidized by its Government. Numerous tramps find their way to Chilean ports with coal from Australia, jute sacks from Calcutta, or miscellaneous cargo picked up where opportunity offers.

A very small amount of the imports comes by way of the Straits of Magellan, but by far the larger part arrives via the Panama Canal. Several factors have been of material assistance in building up the commerce of the United States with the countries of the west coast of South America, and not the least of these is the excellent shipping facilities afforded by the American lines. Another prominent factor has been the establishment of branch houses of American concerns, which conduct a general importing business, exchange banking, and contracting, and act as shipping agents and distributors of American goods of various kinds.

PORTS AND DISTRIBUTING CENTERS.

Nearly half of the total imports of Chile are received through Valparaiso, the port of entry of the central and most populous section of the country. The receipts of merchandise at Valparaiso in 1913 amounted to 158,130,074 pesos of 18 pence out of a total for the country of 329,517,811 pesos, and other years show practically the same proportion. In order of value of imports received, the other leading ports of entry are Talcahuano, Antofagasta, Iquique, Punta Arenas, Taltal, and Coronel. The principal export ports are Iquique, Antofagasta, Mejillones, Tocopilla, Taltal, Caleta Buena, and Valparaiso. In a consideration of the textile markets Valparaiso is the port par excellence, nearly 70 per cent of the imports of cotton goods entering here and a large share of the woolens.

Talcahuana and Coronel are the ports of entry for Concepcion and the south-central section of the country, Iquique is the principal importing city of the nitrate region of the north, Antofagasta is the port supplying the section traversed by the railroad to Oruro and La Paz, and Punta Arenas is the entrepôt for the extreme southern section of the country. At Punta Arenas import duties are collected on only a small number of articles, and the commerce of the section supplied from this center is distinct from that of the rest of the country.

Few ports have adequate harbor works. Most of them are open roadsteads where ships have to lie at anchor some distance from the shore and discharge cargo into lighters. Port works are now under construction at several of the more important places and in some cases considerable progress has been made toward rendering the harbors safe and convenient, but much remains to be done before the facilities can be classed as good. Lack of modern freight-handling apparatus entails tedious delays in the discharge of cargo and materially reduces earnings. Such apparatus is of vital importance at all times and especially at present, when the scarcity of bottoms requires the efficient operation of every available unit.

In planning an itinerary to cover the principal textile markets of the country, for selling only to the large houses conducting a wholesale business, it would not be necessary for the traveler to visit all the larger cities nor any of the smaller ones. The chief offices of the large importing houses are in Valparaiso and Santiago or the other large distributing centers. Most of these maintain branch offices in the smaller places or have a force of travelers that cover the territory at more or less frequent intervals. The route to be taken will depend to some extent on the point of departure, whether Chile is to be visited direct from the United States, from Peru, or from Bolivia. From the north the first stop might well be Iquique, and from this point the journey south can be made by the Longitudinal Railway or by boat, as is most convenient. Stops will be made at the larger cities and towns, such as Tocopilla, Mejillones, Antofagasta, Taltal, Coquimbo, and Valparaiso, and from Valparaiso a trip should be made to Santiago, the capital and most important commercial city of the country. From this point coasting steamers afford transportation southward to the other distributing centers of Chile, and the Transandine Railroad affords means of reaching Argentina and Buenos Aires. The estimated population of the principal cities of the country on January 1, 1916, was as follows: Antofagasta, 56,295; Concepcion, 68,902; Coquimbo, 16,902; Chillan, 38,543; Iquique, 45,502; Puerto Montt, 7,255; Punta Arenas, 20,235; Santiago, 397,550; Talca, 41,618; Talcahuano, 21,876; Taltal, 15,655; Valdivia, 23,464; Valparaiso, 201,507.

INTERIOR TRANSPORTATION.

Chile is better supplied with railroads than any other of the west-coast countries and is the only country on the continent that has railroad communication with two of its neighbors. The total mileage in operation in 1915 was 5,000, nearly two-thirds of which is owned by the State. The railway system was not logically planned and is the outgrowth of several separate lines that have been linked to form a more or less well-connected system of communication between the northern and southern parts of the country, with branches extending to the seaboard cities and interior points. Unfortunately the various original companies constructed their lines without any apparent thought of the future needs of the country and the possibility of eventually uniting all the roads into a homogeneous transportation system, with the result that there are four different gauges in use. The gauge, ownership, and length of the railroads are shown in the following table, the change in the gauge of the Antofogasta-Bolivia road being considered as completed. The gauge is given in meters of 3.28 feet and the length of roads in kilometers of 0.621 mile.

Gauge.	State.	Private.	Total.
Meters.	*Kilometers.*	*Kilometers.*	*Kilometers.*
0.60	290		290
0.76		543	543
1	3,094	1,094	4,188
1.06		412	412
1.27		155	155
1.43		713	713
1.68	2,200	115	2,315
Total	5,584	3,032	8,616

FOREIGN COMMERCE.

A comparison of the import statistics for a period of 10 years shows a considerable variation in the amount of goods purchased from all the leading sources of supply, as well as fluctuations in the total, and might lead to the conclusion that business conditions are somewhat unstable, but such is not the case. The foreign trade of the country was brought to the low level of 1909 ($208,000,000) through reaction from overexpansion, the severe damage to several of the large cities caused by the earthquake of 1906, and the financial panic of 1907. After 1909 the foreign trade increased steadily until 1913, when it reached $265,000,000. The uncertainties resulting from the European war, the withdrawal of credits by the large German houses, and the partial liquidation of these houses in order to strengthen the financial position of the parent concerns in Germany reduced both imports and exports materially. Both are recovering, however, though imports were $14,000,000 less in 1916 than in 1909. Exports, on the other hand, reached a new high level and exceeded those of 1913, the previous record year, by $43,000,000. The large favorable trade balance of 1916 bids fair to be increased in 1917, and as a result the value of the Chilean peso is steadily rising. The following table shows the value of the imports into Chile and the exports from Chile, by principal countries of origin and destination, in 1909, 1913, 1914, 1915, and 1916:

Countries.	1909	1913	1914	1915	1916
IMPORTS FROM—					
Argentina	$6,617,546	$3,262,654	$2,164,936	$2,456,681	$2,513,181
Australia	3,194,089	3,343,831	6,269,379	1,203,806	453,565
Brazil	477,665	971,917	725,974	1,180,948	1,133,853
Belgium	2,750,718	5,671,427	4,151,372	405,615	67,330
France	5,661,502	6,628,801	4,206,107	1,700,383	3,462,372
Germany	22,646,662	29,578,138	25,889,771	3,583.589	452.738
India	2,551,507	3,187,043	1,979,472	2,768,640	4,551,094
Italy	2,629,912	3,176,284	1,976,513	1,732,890	1,752,293
Peru	4,742,948	4,810,339	5,380,220	4,762,542	5,606,427
Spain	877,798	1,135,883	905,684	737,992	2,032,746
United Kingdom	31,879,259	36,109,211	22,309,086	13,288,603	20,049,544
United States	9,636,402	20,089,158	20,148,576	18,638,455	34,458,956
All other countries	1,994,529	2,309,315	2,354,105	3,462,074	4,686,003
Total	95,660,537	120,274,001	98,461,195	55,922,218	81,220,102

Countries.	1909	1913	1914	1915	1916
EXPORTS TO—					
Argentina	$1,262,066	$1,560,800	$2,316,656	$4,052,168	$5,116,233
Australia	91,673	22	154,778	1,971,569	1,177,786
Belgium	2,922,682	5,738,997	3,459,553	....	....
Bolivia	1,256,943	1,532,658	894,403	766,345	1,921,995
Denmark	....	....	508,642	1,519,041	1,419,294
Egypt	57,758	410,506	1,041,704	2,388,234	329,902
France	5,266,178	8,858,313	4,281,701	3,559,934	14,110,816
Germany	24,168,092	30,830.378	18,174,436	....	....
Italy	1,057,469	652,032	770.721	1,712,033	1,899,938
Japan	394,519	1,333,482	823,681	1,779,666	1,409,058
Netherlands	3,363,433	4,470,241	3,292,704	1,443,628	2,415,232
Peru	1,204,693	981,571	475,714	368,459	1,322,809
Russia	....	....	....	1,827,425	6,971,695
Spain	529,065	987,174	3,478	1,636,349	1,572,145
United Kingdom	48,372,367	55,677,548	40,243,881	41,049.949	48,572,571
United States	19,681,594	30,418,801	31,453.550	50,323,796	92.152,853
All other countries	2,218,385	1,200,789	1,485,932	5.131,297	7,066,105
Total	111,846,917	144,653,312	109,381,534	119,529,893	187,458,432

The import trade from the United States has been steadily increasing since 1909, except in 1915, when it decreased less than either of its leading competitors. In 1916 it recouped the loss and exceeded the banner year 1914 by over $14,000,000. Progress in the export trade has been even more notable; except Argentina, the United States is the only country whose gain has been steady during the last five years, and the exports to the United States reached a total in 1916 almost five times as great as the amount for 1909. Part of the increase in exports is due to the higher prices ruling for the products of Chilean mines and farms, but the gain in imports is not to be thus explained, as the customs officials prior to 1916 took no cognizance of the market value of the merchandise in assessing the duties or in making up the statistical returns.

The increase in the import trade is not due in large measure to any special effort on the part of American manufacturers and exporters to increase their sales in Chile, but is rather due to the fact that the goods have won on their merits where introduced and are demanded by the customers. The abnormal increase in the sales to Chile in 1916 is attributable to the fact that stocks had become depleted and with no immediate opportunity to obtain supplies in the countries whence they were usually imported, necessity compelled the importer to turn to the United States. American goods are well liked, and with due attention given to the requirements of the merchants there is every reason to think that a large share of the increase may be retained after the cessation of hostilities. Many classes of goods are now purchased from the United States that formerly never found their way to the country, and merchants are beginning to realize that the stories of the superiority of European fabrics are to be taken with a liberal discount.

COTTON-GOODS TRADE.

Though the United States normally holds third place in the total imports into Chile as well as in exports from that country, its position is seventh in the imports of textiles, the principal sources of supply ranking as follows: United Kingdom, Germany, India, France, Italy, Belgium, and the United States. The position of India is due entirely to the large imports of sacks for various purposes, this item alone amounting to $258,746 for the year 1913, to which the foregoing statement of relative positions applies. Cotton manufacturing has not reached an advanced stage in the country nor is there any probability that the industry will develop sufficiently to affect the import trade for many years, except possibly in a few of the low-grade goods. Most of the cotton-goods requirements will be furnished by foreign countries as in the past.

The imports of cottons from 1913 to 1915 are shown in the following table:

Cotton goods.	1913	1914	1915
Awnings and tents	$13,438	$17,362	$3,565
Bath sheets, bath robes, etc., of pile fabrics	8,526	4,149	3,596
Bed linen	22,210	6,206	2,210
Bedspreads and quilts	310,884	157,933	74,285
Belts	5,749	3,591	1,091
Blankets, bed	123,127	71,508	14,583
Blankets (traveling), ponchos, and mufflers	10,306	2,037	748
Bookbinders' cloth	22,045	14,339	13,248
Calico (choleta)	142,304	68,080	37,750
Canvas and duck	41,260	28,271	13,330
Canvas for embroidery	6,628	1,492	546
Canvas or cloth for alpargatas (sandals)	13,232	9,899	7,381
Caps	8,907	6,286	3,015
Carpets and rugs	6,132	3,086	371
Clothing:			
Cut out, not sewed—			
Men's and boys'	5,596	2,189	629
Women's and girls'	11,753	1,728	3,847
Ready-made—			
Men's and boys'	78,454	46,692	42,843
Women's and girls'	175,660	81,911	35,294
Waterproof—			
Sewed	6,044	8,687	4,325
Not sewed	15,447	3,285	1,799
Collars and cuffs	25,308	18,742	13,051
Collars, lace	3,573	6,712	765
Corsets	27,348	20,377	7,907
Cotton, raw	21,158	9,627	28,790
Curtains and blinds	63,193	39,130	13,208
Damask, table, colored	31,419	12,470	5,880
Dress goods and linings	2,529,259	1,580,151	891,700
Dress goods and linings, part silk	91,040	60,783	27,451
Dress lengths	....	14,739	5,361
Dress lengths, embroidered	11,695	....	....
Dress shields	4,006	2,742	981
Drills, brin, etc., for suits	823,201	445,814	281,599
Duck, sail	48,254	33,212	27,947
Elastic:			
For bandages, bands, or belts	3,872	3,657	1,378
For footwear	16,861	11,572	6,764
Embroidery (including embroidery with silk threads)	7,510	4,251	2,996
Fajas (belts, 25 cm. wide; 3–3½ m. long)	2,724	1,148	1,080
Filter cloths	6,209	2,035	738
Flannel	181,466	67,094	43,516
Flowers, artificial	14,997	5,796	2,567
Fringes	7,181	2,921	816
Gloves and mitts	40,798	27,874	7,646
Gray goods:			
Sheeting, etc. (tocuyos)	629,406	386,329	400,984
Other	134,166	76,294	6,919
Handkerchiefs	241,851	117,515	78,854
Hatbands	3,834	3,193	1,359
Hats:			
Men's and boys'	10,043	4,790	4,057
Women's and girls'	5,272	5,925	2,524
Hose, woven	5,042	7,448	2,236
Knit goods:			
Clothing	9,783	10,409	5,002
Hosiery and underwear	825,683	559,426	212,354
All other (including crocheted goods and net)	39,922	17,871	13,159
Labels or price tickets	1,281	3,966	2,526
Laces	280,342	174,131	66,664
Linon (buckram) and esterilla (canvas) for linings	13,244	7,744	7,691
Mattresses	3,236	3,532	583
Molleton (heavy flannel) for linings	6,212	4,158	697
Neckties	1,996	1,927	1,095
Net (imitation lace), including net with silk embroidery	....	7,091	1,150
Oilcloth	95,323	70,824	34,633

Cotton goods.	1913	1914	1915
Osnaburg or coarse tocuyo for sacks	$429,793	$369,894	$324,844
Oxfords	308,084	188,537	183,496
Passementerie	218,444	120,116	61,495
Passementerie, part silk	81,975	23,279	8,180
Pillows, bolsters, and cushions	3,771	2,728	1,037
Piqué and dimity	76,741	65,104	31,378
Plush and velvet	160,550	116,105	34,523
Ruchings	5,241	5,227	540
Ruchings, part silk	1,993	2,059	318
Sacks, osnaburg	....	3,585	1,809
Sacks or covers for frozen meat	10,112	14,142	43,867
Shawls, mantos, etc	25,814	11,861	4,142
Shirtings (bramante, crea, and crehuela)	22,469	21,720	7,510
Shirts, men's	55,650	33,454	15,160
Shoe linings	14,353	7,181	4,454
Straps and bands, embroidered	367,252	200,319	75,008
Suspenders and garters	65,154	41,665	17,824
Table and other covers	23,075	12,482	2,640
Tablecloths and napkins	63,046	31,033	12,999
Tapestry and curtain materials	110,594	60,702	23,665
Tapestry and curtain materials, part silk	5,647	2,943	1,524
Thread and yarn:			
For darning or sewing—			
Skeins or balls	85,155	55,780	45,307
Spools	433,315	265,573	210,388
For sewing sacks or sails or for packing	17,439	6,069	7,741
For knitting, embroidering, or marking	1,183,658	739,815	869,656
Ticking, striped and plain	308,570	168,145	116,959
Toweling, coarse	3,812	1,894	1,502
Towels:			
Hand	129,678	68,596	33,566
Kitchen	5,875	3,294	1,551
Umbrellas and parasols	108,367	85,474	27,174
Umbrellas and parasols, part silk	9,283	8,241	2,463
Underwear (exclusive of knit goods)	30,937	42,232	10,333
Wadding	6,690	2,490	2,191
Waterproof cloth, rubberized	18,866	18,596	7,100
White goods, plain or twilled	1,676,225	1,033,493	901,208
Wicks:			
For lamps	33,226	15,957	14,060
All other	21,615	15,470	20,146
Waste	171,564	153,310	171,582
All other articles	95,592	60,651	30,562
Total	13,685,035	8,451,284	5,808,984

The annual imports from the different countries fluctuate considerably even under normal conditions, and naturally the abnormal state of affairs at present has greatly changed the relative status of the sources of supply. The customs duties of the country have been levied on arbitrary valuations based on the weight of the goods rather than on the yardage or the market value, and it is therefore impossible to form an accurate idea of the amount of goods of each class imported.

The following table shows the value of the principal kinds of cotton goods imported into Chile in 1913 from the most important countries of origin:

Cotton goods.	United Kingdom.	Germany.	France.	Italy.	Spain.	United States.
Awnings and tents	$6,745	$3,746	....	....	....	$2,842
Bath sheets, bath robes, etc., of pile fabric	4,491	2,305	$1,127	$83	$470	9
Bed linen	2,544	5,701	11,420	1,524	265	693
Bedspreads and quilts	112,703	99,115	13,255	66,991	10,040	1,184
Belts	1,318	2,937	1,299	....	....	196
Blankets, bed	26,246	67,534	3,852	2,892	11,362	1,403
Blankets (traveling), ponchos, and mufflers	2,058	7,804	....	139	102	....
Bookbinders' cloth	7,453	9,329	1,200	3,035	....	1,028
Calico (choleta)	131,311	4,333	3,885	2,727	....	2
Canvas and duck	21,304	11,290	954	161	108	6,562
Canvas for embroidery	1,240	4,722	537	116	....	....

Cotton goods.	United Kingdom.	Germany.	France.	Italy.	Spain.	United States.
Canvas or cloth for alpargatas	$4,283	$2,774	$688	$2,576	$349	$2,562
Caps	3,910	2,371	1,847	47	686	....
Carpets and rugs	4,152	1,555	388	....	26	....
Clothing:						
Cut out, not sewed—						
Men's and boys'	196	2,253	1,043	....	123	....
Women's and girls'	186	5,349	5,286	....	70	666
Ready-made—						
Men's and boys'	30,726	23,036	11,798	1,605	688	10,333
Women's and girls'	45,250	57,621	69,622	528	131	410
Waterproof—						
Sewed	2,894	1,314	515	51	....	1,270
Not sewed	9,026	5,289	533	584	....	15
Collars and cuffs	9,671	6,289	7,062	879	....	1,407
Collars, lace	383	2,711	339	....	....	....
Corsets	6,822	5,403	9,826	319	274	4,333
Cotton, raw	742	314	3,478	91	....	66
Curtains and blinds	13,264	31,905	13,279	1,083	131	1,740
Damask, table	4,877	19,622	72	6,789	....	....
Dress goods and linings	1,912,901	374,247	93,951	74,057	23,100	9,021
Dress goods and linings, part silk	39,023	13,432	31,063	6,170	916	53
Dress lengths, embroidered	1,651	5,843	4,047	136	....	....
Dress shields	312	1,775	1,919	....	....	....
Drill, brin, etc., for suits	335,616	304,766	11,853	99,795	17,974	6,706
Duck, sail	22,479	3,567	36	2,259	555	16,919
Elastic:						
For bandages, etc	210	3,105	374	183	....	....
For footwear	3,197	5,396	5,076	2,271	....	....
Embroidery	1,678	3,910	1,870	44	9	....
Fajas	74	182	1,115	994	359	....
Filter cloths	174	5,915	74	....	....	46
Flannel	30,833	37,868	23,340	6,588	668	77,676
Flowers, artificial	1,803	7,753	5,285	10	....	....
Fringes	86	3,965	1,305	1,825	....	....
Gloves and mitts	2,829	31,376	6,410	....	....	....
Gray goods:						
Sheeting, etc	397,287	30,660	5,710	8,677	797	89,512
Other	133,926	20	....	220	....	....
Handkerchiefs	211,855	20,635	5,993	1,876	372	427
Hatbands, inside	225	1,434	534	1,641	....	....
Hats:						
Men's and boys'	3,443	1,323	4,341	936	....	....
Women's and girls'	1,698	406	3,115	51	....	....
Hose, woven	2,936	998	241	....	....	688
Knit goods:						
Clothing	1,534	6,886	778	51	169	....
Hosiery and underwear	91,569	588,465	34,188	17,477	52,633	33,414
All other (including crocheted goods and net)	4,047	20,671	6,809	1,764	2,714	3,578
Labels or price tickets	770	316	113	18	....	26
Laces	121,800	106,091	49,574	467	110	....
Linon and esterilla	7,458	2,788	2,522	299	120	52
Mattresses	957	716	247	181	9	1,000
Molleton for linings	1,607	1,472	1,211	1,295	85	....
Neckties	697	602	635	58	....	4
Oilcloth	48,862	38,607	3,250	117	....	4,110
Osnaburg and coarse tocuyo for sacks	89,952	32,537	....	801	....	294,564
Oxfords	265,465	30,759	2,427	8,375	156	420
Passementerie	20,200	106,228	48,249	21,049	1,317	1,771
Passementerie, part silk	3,873	34,493	19,757	23,298	55	66
Pillows, bolsters, and cushions	765	458	265	35	....	2,230
Piqué and dimity	23,848	30,492	6,399	13,836	986	19
Plush and velvet	76,151	58,692	19,719	806	175	....
Ruchings	1,252	3,157	2,825	....	....	....
Sacks or covers for frozen meat	10,112	....	....	....	....	....
Shawls, mantos, etc	1,637	15,026	73	1,138	7,605	16
Shirtings	15,736	3,046	1,571	770	765	416
Shirts, men's	18,748	16,631	14,363	1,384	740	3,601
Shoe linings	5,801	3,322	2,560	1,873	....	160
Straps and bands, embroidered	39,842	272,113	19,715	17,181	....	279
Suspenders and garters	11,636	30,867	7,095	4,467	....	10,539
Table and other covers	4,068	9,096	4,153	2,995	734	291
Tablecloths and napkins	9,960	30,879	4,957	15,742	240	401
Tapestry and curtain materials	62,538	19,563	7,511	17,620	142	389
Tapestry and curtain materials, part silk	1,886	838	1,568	1,066	289	....
Thread and yarn:						
For darning or sewing—						
Skeins or balls	50,774	16,786	6,143	775	....	7,509
Spools	370,253	24,680	34,400	420	....	424
For sewing sacks or sails or for packing	9,698	55	12	54	....	5,557
For knitting, embroidering, or marking	255,202	336,975	16,994	252,275	....	32,076

Cotton goods.	United Kingdom.	Germany.	France.	Italy.	Spain.	United States.
Ticking	$119,820	$83,917	$17,828	$6,321	$30,817	$7,805
Toweling, coarse	599	352	2,281	487	93	....
Towels:						
Hand	61,753	23,606	14,537	13,733	14,767	1,056
Kitchen	1,663	1,914	336	396	117	20
Umbrellas and parasols	8,742	39,001	6,413	45,407	7,861	131
Umbrellas and parasols, part silk	1,322	2,970	2,979	1,513	246	....
Underwear (exclusive of knit goods)	7,143	15,094	6,433	46	77	66
Wadding	1,914	3,265	558	839	....	7
Waste	154,213	11,251	599	1,139	....	3,559
Waterproof cloth	11,589	5,179	2,034	....	....	26
White goods, plain or twilled	1,496,912	86,676	37,475	28,087	7,726	12,868
Wicks:						
Lamp	7,608	22,583	258	....	....	1,516
All other	11,425	5,698	....	296	....	3,134
All other articles	26,597	47,689	13,076	3,432	603	5,093
Total	7,098,034	3,437,700	795,847	809,336	200,926	675,962

Though the Chilean statistics are replete with detail, they do not shed much light on many questions that are of interest to manufacturers and exporters. No idea can be obtained as to the quantity of unbleached, bleached, printed, and colored goods, as portions of these appear under various classifications with no indication of the relative quantities. A few types are segregated, so that a fair estimate of quantities may be made. The system of arbitrary customs valuations,[a] however, renders the figures unsatisfactory, and there is no means of checking them, as quantities are stated in kilos and the values are stated on a fixed valuation of each "partida," or section; the market value of the goods, their construction, and their weight do not enter into the matter. For example, white goods are found under the heading "shirtings" and also under "white goods, plain or twilled," while another portion is found under the heading "bed linen."

In the discussion of sources of supply it should be kept in mind that the normal conditions of 1913 and previous years are referred to. Conclusions based on present conditions would be misleading, because just at present there are demands for many types of American goods that formerly sold in very limited quantities, and in many stores the assortment of American fabrics is fairly complete, so that the casual observer would be warranted in the assumption that the United States occupies a very prominent position in the trade. Such a conclusion, however, would apply only to the war years. The American share in the normal textile trade of Chile was much smaller than it should be and prior to the war was not increasing at a satisfactory rate.

The United Kingdom supplied principally white goods, dress goods and linings, gray goods, thread and yarn, drills, oxfords, handkerchiefs, waste, calico, laces, ticking, and bedspreads; Germany, knit goods, dress goods, drills, insertions, passementerie, and laces; Italy, yarns, drills, dress goods, and bedspreads; France, dress goods, ready-made clothing, and passementerie; Belgium, yarn, drills, knit goods, and ticking; United States, osnaburgs, gray goods, and flannels; Spain, knit goods, ticking, and dress goods.

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[a] Since 1916 the valuations in the statistics are based on the declared values, but the statement in the text is true for all figures given in this report.

RAW COTTON, WASTE, YARN, AND THREAD.

There are no cotton-spinning mills in the country and the imports of raw cotton are used in the manufacture of mattresses, with the exception of the negligible quantity consumed by the Indians in making hand-spun yarns. Peru supplies nearly all the raw cotton, selling $16,388 out of the total of $21,158 imported in 1913. Considerable quantities of waste are imported, chiefly from the United Kingdom, for use by the railroads and machine shops.

There are several knitting and weaving plants scattered through the country which have no spinning machinery and are, therefore, dependent on outside sources for yarns. The imports of manufacturing yarns can not be determined from the statistics, as the classification includes embroidery and marking threads as well. As there are 14 textile establishments in the country using cotton yarns, it is fair to suppose that the greater part of the $1,183,658 worth of yarns brought in during 1913 was for manufacturing purposes. None of the plants are large as compared with American mills, but they are very satisfactory units for a country that has not been developed extensively along manufacturing lines. The goods made are for the most part the lower constructions in fancies.

Germany, Italy, and the United Kingdom supplied most of the yarn, the greater part of which is used by the knitting mills and the few weaving mills. Most of the yarn imports are knitting yarns of Nos. 8 to 24. American yarns are imported in small quantities, but the principal users of manufacturing yarns are Europeans, and it is unlikely that they will purchase largely in the United States when they can obtain needed supplies in their own countries. There is one weaving mill owned by an Anglo-American concern, and a fair quantity of the yarn requirements are purchased from American makers. One obstacle to purchasing yarn from American mills is the fact that practically all the American yarn business is done on very short time, while European makers are accustomed to extend long credits. The prevalent conditions have made great changes in the methods of doing business, however, and it is improbable that such liberal terms will be extended in the future as have ruled in the past.

The sewing threads are practically a British monopoly; 85 per cent of the total imports came from British mills in 1913, Germany supplied about 6 per cent, and France about 8 per cent, while the United States sent less than one-tenth of 1 per cent.

WHITE GOODS.

Aside from "dress goods and linings," a rather broad classification, white goods is the largest single item in the list of cottons, but this item includes plain-woven cloths as well as twills, so that no accurate idea can be formed as to the amount of each type imported. From an investigation of the stocks in the leading stores and consultations with the larger importers it would appear that sheetings and shirtings are the principal items under this classification. By far the greater part of these are supplied by the manufacturers of the United Kingdom, the objection to American goods being confined almost entirely to the finish. Very few dealers criticize the weight, construction, or intrinsic worth of the cloths. In fact, many of those questioned about the matter acknowledged that after the first laundering American goods have a superior appearance; but as one dealer remarked, the goods are sold before passing this test, so that the subsequent appearance has little to do with the marketing of the goods. Of the total imports of white goods in 1913, amounting to $1,676,225, the United Kingdom supplied about seven-eighths or $1,496,912 worth, Germany, France, and Italy following in the order named and the United States coming fifth with but $12,868 worth. The most salable cloths are the 30, 32, and 36 inch goods that can be retailed at 1 to 1.50 pesos per meter (24 to 36 cents per yard with the peso at 26 cents). Wide goods are not in extremely good demand, though some 2-yard sheetings are imported. Several of the most popular white shirtings are made with a soft finish. One of the leading makes of this type is an English cloth made in widths of 28 to 36 inches and constructions varying from 88 by 76 to 64 by 60 threads per inch. This cloth is numbered according to the width, the No. 7, 34-inch, 80 by 72, soft finish, invoicing from England at 13s. 9d., less 2½ per cent, per piece of 40 yards, which is 8.4 cents per yard, less the same discount. Prices on all lines have greatly advanced and even now are changing from week to week, so that quotations of current prices are of relatively little value. The standard length of all cottons in this market is 40 yards per piece, though more or less 20-yard pieces are brought in, particularly in the finer goods.

There is a good market for the finer bleached goods, muslins, lawns, and similar cloths during the summer season in all parts of the country except the extreme south. Evidently this classification includes many of the goods of lower construction, for the section devoted to bramantes, creas, and crehuelas, as the coarser cloths are designated, totals only $22,469, a figure far too small to cover so important a branch of the business. A single store in Santiago distributes more than one-third of this amount annually, and one importer puts his sales of a single number at 5,000 pieces per year. These are made with coarser yarns than the shirtings previously referred to, and are invariably with a heavier sizing, some of them medium stiff and others very boardy in handle.

FLANNELS AND FLANNELETTES.

There is an excellent market for all types of napped goods throughout Chile, though the import statistics would not convey this impression. The total under this heading for 1913 was only $181,000, manifestly a figure far too low, as it is generally conceded that flannels and other napped goods are among the leaders in the types of textiles in greatest demand. Discussion with a number of importers and large retailers of the relative amounts of the different classes of cottons marketed leads to the conclusion that flannels are either second or third in the list, several well-informed factors stating their belief that the sale of these goods closely approximates the figures for gray goods. Probably many flannelettes are placed under the classification dress goods. The greater part of the imports are printed flannelettes, of which England and Germany sell the larger share, with Italy a close competitor on certain lines and the United States having a very small part the trade.

Several years ago the trade in canton flannels was very largely in the hands of American exporters, but more recently the increasing domestic production and more severe competition from neighboring countries have reduced the lead of the United States, which now supplies a smaller percentage than it did 15 years ago. German competition has been increasingly severe, and during the last few years Japan has entered the market with low-priced goods that in many cases are very creditable in appearance and construction. Nearly all the Japanese goods are white flannels and the majority are lighter in weight than those from other countries. Canton flannels are used extensively for underwear for men, women, and children. Men wear canton-flannel drawers and knit shirts during the winter, and the poorer class frequently wear flannel shirts as well as flannel drawers. Colored flannels are in good demand in various widths and construction, but the largest yardage is marketed in printed flannelettes and in those woven with colored yarns, the prints very greatly predominating. Tartans are popular; probably more are marketed in Chile than in all the other west-coast countries combined. Prices quoted would indicate that American mills should be able to compete with the foreign makers in these lines, and it would seem that a well-conducted selling campaign would produce excellent results. Nearly all the printed goods have very little light ground, but one line that is well received has a cream ground with small flower or conventional effects scattered over it. Stripes are not so prominent a feature of the market in Chile as in some of the other countries.

A heavier type of flannel, known here as molleton, is sold in large yardages and is used for bath robes as well as for other purposes. Inquiry as to the reason for purchasing elsewhere rather than in the United States usually brought forth the statement that it is impossible to obtain from American exporters the assortments wanted, while the German, English, French, or Italian makers would pack the styles to suit the requirements of the trade. While selling in case lots has been found to work very well in the American domestic market, where the stylers who make up the assortments are more or less familiar with the demands of the trade, it is far from satisfactory in export business, where the styler usually has at best a very slight knowledge of the peculiarities of the market. Assortments that would prove acceptable in the domestic trade frequently are radically different from those needed by the foreign buyer. Criticism of the fabric is seldom heard; the majority of the purchasers state that the cloths are satisfactory and confine their complaint to the matter of assortments.

A large yardage of flannelettes is consumed for girls' school dresses for the school season. The most populous section of Chile enjoys a temperate climate, with no severe weather even in winter except in the interior and the mountain regions; but as the houses have no heating apparatus it is necessary to dress somewhat more warmly than in a similar climate in the United States and flannelettes fill the requirements for winter dress material.

PRINTS.

American prints are seen in greater numbers than ever before, though the use of light-colored goods is not so common as in many other countries. Black is considered the only color appropriate for attendance at the numerous church services, and the streets are filled with black-clad figures, their heads enveloped in mantos.[a] The well-to-do class wear mantos of fine lace; those less favored by fortune content themselves with woolen goods and the poorer class wear mantos made of black calico. There is a tendency on the part of the younger women to wear colors more than in the past, particularly for house and afternoon dresses. The market for dress prints, therefore, is slowly increasing, but it will probably be many years before they are an important item in the imports of the country. The insignificant position of prints in the market is indicated by the fact that all prints are indiscriminately designated percales. In a few of the stores fairly good assortments of the finer dress prints are to be found, but the sale is not large. Several styles were seen in cheap goods, the narrower splits from England, but there is no widespread demand for goods that can advantageously be produced in this manner.

Shirting prints are sold in considerable quantities, mostly the 30–32 inch percales, used extensively in the domestic shirt industry. Several good-sized factories are engaged in the manufacture of shirts, collars, and cuffs and in addition, several of the larger dry-goods stores have manufacturing departments in which they turn out the goods required for their own trade.

The ordinary price of the percales on to-day's market (July, 1917) is 80 centavos to 1.50 pesos per meter, and as the peso is worth about 26 cents, this figures out about 19 to 36 cents a yard. Complaint is heard of the inability to secure the assortments wanted from American houses and the arbitrary method of making up case lots.

Printed muslins are gaining in favor, as are some of the fancy-woven printed goods, such as crêpes, seersuckers, and the finer crinkle cloths similar in appearance to ripplette. These are known in the trade as crespones pintadas or simply crespones. In the present season (1917) printed voiles are in good demand, the prices ranging from 2 to 8 pesos per meter ($0.48 to $1.90 per yard). Many of those seen in the stores are of English and French manufacture, but a fair number of American styles is displayed by several houses. The prices would appear very high even at the low rate of exchange ruling a year ago; the conversions were made at the rate of 26 cents to the peso. The range of prices indicates that there is a wide variety of constructions on the market. The most popular styles appear to be those with small floral designs scattered over the ground rather plentifully, or sprays of roses or other flowers, larger but well-spaced and in delicate colors.

FANCIES AND GINGHAMS.

There is a wider distribution of goods made from colored yarns in Chile than in any other west-coast country, ginghams and oxfords leading in the dress goods, and tickings and casinetes holding the predominant position in the heavier cloths. Ginghams of all grades are known as vichy, a term that is used in several of the other Latin countries for the lower-grade goods, the finer constructions being known as céfiros. The smaller stores in the vicinity of the markets and those outside of the first-class shopping districts carry a quantity of narrow splits about 20 inches in width, 64 by 48 construction, retailing at 80 centavos per meter (19 cents per yard). Nearly all the lower-grade goods are very heavily starched, including the ordinary small checks, which retail at prices ranging from 1 peso to 1.50 pesos per meter (23.8 to 35.7 cents per yard) for the 32-inch, 60-square goods. All the price quotations appear very high, and in fact are higher than would seem justified by the cost of the goods, but business is more or less uncertain owing to the fluctuating currency and the merchant places his prices at a figure that precludes any probability of loss. In many cases the price is double the cost, and it is unusual to find a selling price less than 50 per cent over cost.

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[a] The head covering known as manta in Bolivia is termed manto in Chile, where manta is used to signify a traveling blanket.

Twilled cloths identical in construction with the ginghams, known in the market as oxfords, are sold in considerable yardages, the popular prices for these ranging from 1.15 to 1.50 pesos (28.2 to 35.7 cents per yard). The leading number this season (1917) sells for 1.30 pesos per meter (30.9 cents per yard). Most of these are in checks and stripes, similar to the most salable styles of ginghams, the best selling style at present being a shepherd's check in quarter, three-eighth, and half-inch sizes. Next to these come the black and white stripes about a half-inch wide.

Seersuckers are well liked in the narrower stripes and are sold under the name crespon. Many of the stores show a fairly representative line of these materials from American manufacturers and state that they are very satisfactory. European makers have supplied the market with splits in this type of material up to 28 inches in width, but they are not so well liked as the cloths made with two perfect selvages.

Low-grade stripes, checks, and plaids are sold in large volume, the low earning capacity of a great majority of the people making it imperative for them to use the strictest economy in their purchases. They are forced to buy the heavier yarn fabrics that are calculated to give the longest service for the smallest outlay, regardless of the better appearance of the goods of finer construction.

DENIMS, DRILLS, AND TICKINGS.

Denims are not so much used in Chile as in some of the other countries, their place being taken by the lighter-weight casinetes and brines. A few are imported from the United States, but the quantity is so small as to merit little attention. Drills are used extensively in grays, colored goods, and prints, the United States supplying a fair proportion of the grays but selling relatively few of the dyed and printed cloths. Peru has made notable inroads on the market for gray and dyed drills. It is unable to supply prints, however, and there is no probability that printing will be done in Peru, at least for many years. American tickings are well known in the market, but the American proportion of the trade is very small, because most of the goods from the United States are of a better quality and therefore higher in price than those made in Europe. England, Germany, and Belgium have been the principal sources of supply, Spain and France have furnished a fair quantity, and the United States and Italy sent $8,000 and $6,000 worth, respectively, in 1913.

OSNABURGS, GRAY GOODS, AND DUCKS.

The United States has the predominant position in the market for osnaburgs, supplying three times as much as its nearest competitor and in 1913 furnishing 89 per cent of the total imports. The demand for this cloth is in great measure due to the need of sacks for the shipment of flour and other commodities to foreign countries as well as within the national limits. Labor is cheap, and for that reason the goods are imported and the sacks made up by local manufacturers, this industry furnishing a means of livelihood to a large number of operatives. The material used is a low-grade osnaburg, 29 inches wide, 30 by 30 construction, weighing 3.30 yards per pound. The imports amounted to $429,792 in 1913 but decreased, in common with nearly all other types of goods, in the two subsequent years.

Gray sheetings are one of the most important items in the imports, but it is impossible to obtain the exact figures for the quantity brought in, as they are classified with other similar cloths. According to statements made by the leading merchants, it would appear that gray sheetings form the principal part of the imports, the favorite type being the 36-inch width, though there is some demand for the narrower goods. Broad sheetings are not marketed to any extent in grays. Shirtings are mostly from England; a few come from Spain and Belgium.

In the imports of sail duck England and the United States have a monopoly of the trade, supplying in 1913 about four-fifths of the total requirements. In other types of duck and canvas Germany had a considerable share of the business, while the American portion amounted to a little less than one-seventh and England's share was about half.

CASINETES, BRIN, AND CORDUROY.

The distribution of men's wear cottons is an important feature of the Chilean trade. The poorer class dress in cotton fabrics through the entire year in many parts of the country, and in all but the extreme south they wear cotton for at least nine months of the year. Casinetes, or cottonades, are supplied by England, Italy, Germany, the United States, and Spain, but the relative quantity from each country can not be ascertained with any degree of accuracy because these goods are included in the section containing drills and the lighter type of cottonade, termed "brin." Germany supplies generally the lower-grade materials, the best type comes from Italy and the United States, and England furnishes the medium qualities. Many of the Italian goods are creditable imitations of the styles seen in the worsted cloths, made in four-harness twills with herringbone effects or basket weaves and other broken effects to give more character to the designs. The most salable patterns are those suitable for trouserings, and there is a good demand for separate garments. There is an increasing demand for casinetes in double widths, and it would be an easy matter for American exporters to obtain a much larger share of the trade if they were prepared to supply broad goods. The "brines" are used in great measure for making boys' school suits and summer clothing for the men and to some extent for skirts for the working women.

Diablo fuerte, as corduroy is termed, is not so prominent in the Chilean market as in Peru. England, Germany, and Italy are the principal sources of supply, very little coming from the United States. The better grades are made in England and Italy; Germany sent the inferior, heavier goods.

BLANKETS, PONCHOS, AND HANDKERCHIEFS.

The demand for blankets is not large, the imports for 1913 amounting to only $123,127. More than half came from Germany, a very low-grade type with cotton warp and a filling of cotton waste. A few of the better grades are imported from England, Spain, and Belgium, but the share of the United States is very small, amounting to only $1,400. Ponchos are not sold in great numbers, as the woolen goods are preferred, and in addition they are not used so generally in Chile as in the other countries.

Imports of handkerchiefs are surprisingly large, amounting in 1913 to $241,851, of which Great Britain supplied $211,855 worth. France furnished $5,993 worth, and Germany's share was $20,635, while the United States supplied the small sum of $427. It would seem that a trade as extensive as this should be worth some effort to obtain, and there is no apparent reason why American manufacturers should not have a much larger share of the business. Many of the handkerchiefs are made with colored borders; in fact, the appearance of the windows would lead to the conclusion that colored goods are in much better request than white. Initialed goods are not in particularly good demand in either men's or women's sizes, the total imports amounting to less than $1,000.

KNIT GOODS—CORSETS AND LINGERIE.

The knit-goods trade is not of so much importance as in some of the other countries because there is a considerable domestic production of hosiery, underwear, and other knit goods. The local mills engaged in the manufacture of underwear do not turn out so well-made a garment as is imported, and there is likely to be a continued demand for the higher-grade foreign garments. The lower classes, however, will purchase the homemade article because of its lower price, the cost factor being more important to them than fit or appearance.

The hosiery was supplied very largely by Germany. More than half of the total imports of knit goods came from that country and by far the greater part of the hosiery. The lack of imports from Germany during the last few years has compelled the merchants to seek other sources of supply, but it is not unlikely that they will again turn to Germany for their hosiery as soon as conditions permit, for they do not like the seamless hose generally imported from the United States. Complaint is made that the seamless hosiery does not fit so well as the full-fashioned, and customers invariably ask for the full-fashioned goods, regardless of the fact that they are more expensive.

Sweaters are worn generally by both men and women. They are made in the country by one or two mills and few are imported. The most popular in the women's trade are the fancy stitches, with collar and sash—a sort of Norfolk-jacket effect. Knit mufflers are worn much more than in the other west-coast countries; nearly everyone wears one during the cooler months and it is not unusual to find the natives with mufflers around the neck and pulled up over the mouth and nose, particularly in the evening, even when the weather is such that Americans are walking with the light overcoat unbuttoned. Most of the mufflers are woolen, some of them llama or vicuña.

There are several corset factories in the country; some turn out a very good corset, but the majority make a much cheaper article than the imported corset. These factories consume a fair yardage of coutils (ticking) annually, in both plain and fancy styles. The yardage of fine goods and silk mixed goods is negligible. The lingerie market is supplied very largely by the local manufacturers.[a]

PASSEMENTERIE.

That there is an excellent market for small wares in Chile is strongly evidenced by the fact that there are numerous stores entirely devoted to the distribution of notions, edgings, threads, embroidery cottons, ribbons, veilings, and similar articles classed as "paqueteria" by the department stores, under which name the smaller establishments operate. Formerly Germany supplied a greater amount of these goods than any of the other competing nations, but even prior to the war there was a noticeable decrease in the imports of such merchandise from Germany. Swiss manufacturers were furnishing more each year and the mills of France as well were cutting into the trade very perceptibly. It is impossible to determine the exact amounts of the various types of goods imported under the different headings, as all are grouped in the single classification "pasamaneria" in the statistics. Some of the leading importers are of the opinion that the greater part of the goods under this classification are the narrow edgings and insertions, including the so-called Barmen laces. If this is the case it would appear that the German supremacy in such goods is a thing of the past, as the assortment in many of the stores includes a very small percentage of German goods of this character. Braids and galloons are supplied by England and France to a considerable extent, but the market for this type of merchandise is small at present. Some half-dozen type samples of the most popular edgings and insertions, as well as a few of the braids, are included in the collection forwarded with this report. It will be understood by those familiar with the trade that the demand for braids is dependent to a very great extent on fashion and that the condition of the market in any given period may not adequately represent the average requirements.

SILK-GOODS TRADE.

The following table shows the imports into Chile of the principal silk manufactures in 1913, 1914, and 1915:

Silk goods.	1913	1914	1915
Threads:			
Sewing and darning	$19,183	$19,292	$7,016
Knitting and embroidering	93,623	57,318	36,998
Ribbons	164,667	119,984	59,298
Bedspreads and quilts	10,090	6,673	2,802
Neckties	50,328	28,113	14,859
Curtains	22,183	8,010	6,299
Laces and scarfs	15,161	5,740	7,746
Flowers	9,385	5,156	1,056
Curtain and tapestry materials	12,923	6,830	4,351
Dress goods and linings	584,869	401,819	217,812
Caps	8,491	5,601	2,508

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[a] A detailed report on the wearing-apparel market of the country, by Special Agent Tucker, will shortly be issued by the Bureau.

Silk goods.	1913	1914	1915
Gloves	$9,361	$4,971	$2,415
Handkerchiefs	61,613	28,330	10,212
Stockings	12,947	5,806	8,405
Shawls, mantos, and mufflers	56,337	33,142	16,664
Umbrellas and parasols	34,821	17,055	3,568
Passementerie	116,955	52,321	21,650
Velvet and plush	49,515	50,162	11,281
Veilings	12,297	6,572	4,538
Knit goods	9,884	16,873	4,863
Buttons	6,150	3,703	610
Socks	5,859	5,871	8,415
Bolting cloth	3,052	2,394	2,251
Clothing for women and girls:			
Cut out, not sewed	5,972	1,354	736
Ready-made	222,297	150,711	63,169
Hats:			
For men and boys	8,532	4,808	1,161
For women and girls	48,903	60,580	17,711
All other articles	40,645	36,852	23,054
Total	1,696,043	1,146,041	561,448

The most important item in the trade is dress goods and linings, amounting to $584,869, mostly from France, Germany, the United Kingdom, and Italy, in the order named. The dress-goods business amounts to more than one-third of the total imports, the next item in importance being clothing for women and children, and the third, ribbons. France has an enormous lead in the apparel trade, supplying nearly four times as much as Germany, the leading competitor. In ribbons Germany supplies nearly 50 per cent of the total, France 30 per cent, and England 13 per cent.

The following table shows the value of the principal imports of silk from the most important countries of origin in 1913:

Silk goods.	United Kingdom.	Germany.	France.	Italy.	United States.	Belgium.
Thread and yarn:						
Sewing or darning	$7,465	$6,904	$2,257	$517	$1,577	$433
Knitting and embroidery	5,802	27,450	48,000	12,024	219	117
Knit goods	4,547	1,362	1,955	299	396	51
Buttons	695	4,143	1,311	....	....	....
Socks	649	1,600	1,171	22	1,976	....
Table covers	73	1,118	59	....	....	29
Ribbons	20,820	84,711	49,868	5,519	363	3,826
Bolting cloth	296	1,444	1,315	....	....	....
Bedspreads and quilts	4,514	1,424	3,112	561	19	....
Neckties	19,272	11,330	17,740	1,254	5	131
Curtains	7,544	6,047	7,877	....	350	365
Corsets	480	490	1,315	181	....	....
Lace and ruching	2,461	3,398	7,906	876	279	....
Artificial flowers and plants	720	2,954	5,194	289	....	....
Tapestry and curtain materials	3,020	5,322	2,770	1,093	....	32
Dress goods and linings	113,789	116,809	284,973	35,476	293	5,425
Caps	5,042	899	2,313	1	....	....
Gloves	929	6,812	1,102	278	....	127
Stockings	3,941	1,509	1,520	....	5,285	9
Handkerchiefs	13,007	12,885	12,258	1,645	37	1,142
Shawls, mantos, and mufflers	9,290	10,819	17,345	4,795	....	....
Umbrellas and parasols	10,112	12,977	8,282	3,695	....	....
Passementerie	5,221	43,243	38,210	26,731	341	2,694
Clothing for women and girls:						
Cut out, not sewed	189	170	2,927	....	2,042	....
Ready-made	31,600	38,691	144,310	2,979	....	216
Hats:						
For men and boys	2,570	800	4,721	379	....	....
For women and girls	6,381	1,209	38,991	1,264	....	....
Plush and velvet	18,703	12,737	16,901	679	102	327
Suspenders and garters	1,129	438	885	95	193	....
Veils	574	4,895	5,607	22	....	....
All other articles	7,520	9,397	9,605	2,207	501	216
Total	308,355	433,987	741,800	102,881	13,978	15,140

A great diversity of fabrics is required in the silk trade, from heavy grosgrains and satins, taffetas, and liberty silks to crêpe de chines and voiles. Possibly taffetas are sold in as large yardage as any other single type; blacks take the lead over colors, as many of the women who are able to afford it have a black silk dress to wear to church. One of the best selling types is invoiced from France at 6.50 francs per meter ($1.15 per yard) and is marketed in Santiago at 16.75 pesos per meter ($3.98 per yard, with the peso at 26 cents). Even with a duty estimated to amount to 35 per cent and the high cost of transportation and insurance it would appear that the price is excessive. A cotton-back satin sold in fairly large quantities is invoiced at 2.60 francs per meter ($0.46 per yard), and sold at 7.50 pesos per meter ($1.78 per yard). Satins are not so popular as the other types of silks for dress purposes, but a considerable quantity is brought in for linings in the better grade of men's suits. A light-weight, all-silk satin that has a wide distribution is shown in the collection of samples forwarded with this report; it invoiced at 2.90 francs per meter ($0.51 per yard) and sold at 7.75 pesos per meter ($1.84 per yard). In the present season (August, 1917) crêpe de chine is a favorite, one of the most popular numbers invoicing at 5.70 francs per meter ($1.01 per yard) and selling at 15.75 pesos per meter ($3.74 per yard). Pongees are much favored for waists and for misses' costumes, many of them coming from Japan as well as from France and Italy. A typical sample is invoiced from Japan at $0.55 per meter ($0.50 per yard) and is sold at retail at 6.70 pesos per meter ($1.59 per yard). Many of the cloths used for linings are a mixture of silk and cotton, some of them satins, others flat twill weaves known in the trade as polonesa. Invariably these are in herringbone designs, the pattern from half to three-quarters of an inch in each direction. The prices vary more or less with the quality and weight, one of the best selling grades invoicing from France at 2.25 francs per meter ($0.40 per yard) and retailing at 6 pesos per meter ($1.43 per yard). There are many other types of silk goods in demand, but the few types mentioned are the most salable and will serve to show the class of fabrics imported in largest quantities.

In addition, large yardages of necktie silks are brought in, as the greater part of the neckwear is made in the country. The two principal department stores in Santiago have shops in which they manufacture practically all of the cravats distributed by them, and nearly all the shirt makers have departments devoted to the production of cravats. Many of the tie silks are products of Italian looms, costing 5 to 8 lire per meter ($0.88 to $1.41 per yard). The price of the material and the retail price of the cravat depend to some extent on the workmanship and style as well as on the amount of goods required for the manufacture of the goods. A straight-end bow tie made of a silk costing 7.50 francs per meter ($1.32 per yard) sells at retail for 2.50 pesos ($0.65); a wide-end bow made of the same material sells for 2.90 pesos ($0.754). A rather narrow-end four-in-hand made of a 2.10-franc material ($0.37 a yard) sells at 2.90 pesos ($0.754), while one made in the same style from a 1.10-franc material ($0.19 a yard) sells for 90 centavos ($0.234). The higher-grade scarfs are made with full ends and from high-grade material costing 6 to 10 or 15 francs per meter ($1.06 to $1.76 or $2.64 per yard). A sample sent with this report is made of goods costing 6.75 francs per meter ($1.19 per yard) and is retailed at 6.50 pesos ($1.69). The patterns in tie silks are not greatly different from those in vogue in the United States and it would seem that American manufacturers should be able to obtain a portion of this business, as well as a larger share of the trade in dress silks of all kinds.

There is a very limited demand for silk hosiery or underwear. There is a moderate sale for silk boot stockings, or stockings with cotton sole and garter top, but the trade is not sufficiently large to warrant any special effort. The United States and the United Kingdom supply the greater part of the demand in both socks and stockings. The sale of silk underwear amounts to less than $5,000 a year; nearly every one wears cotton, linen, or wool.

Handkerchiefs usually receive little attention in the consideration of the textile markets of a country, but they are of more importance in Latin-American countries than many other articles. In Chile the imports of silk handkerchiefs in 1913 amounted to $61,613. Japan supplied more than any other country, the imports from that source being valued at $18,382. England, Germany, and France are nearly equal in the trade, the figures for 1913 showing that the value of the imports from these three countries was $13,007, $12,885, and $12,258, respectively. Of the 13 countries shown as catering to this trade, but one, Mexico, supplied less than the United States, the figures for these two countries being $2 and $37.

WOOLEN-GOODS TRADE.

The total imports of woolen goods amount to about $8,000,000 annually, the principal normal sources of supply being England, Germany, and France. The most important item is cassimeres, which include all sorts of men's wear cloths (worsteds, cassimeres, cheviots, meltons, overcoatings, and uniform cloths), as well as many of the fabrics adapted for women's wear. The nomenclature of fabrics is very deficient in Spanish and it is impossible to gain a very clear idea of the cloths from the published statistics. Two mills are engaged in the production of woven goods and various knitting mills are fitted with machinery for the manufacture of sweaters and other types of knit goods. This home industry accounts in part, at least, for the relatively small quantity of woolens imported into a country where a woolen suit can be worn with comfort through the entire year. Neither of the mills is equipped with worsted spinning machinery nor do they purchase worsted yarns to be woven into cloths, except possibly very limited quantities to be used for decorative purposes, the making of a finer stripe than is practicable with woolen yarns, or some similar purpose. Neither of the mills has modern equipment in any department. Little attention is paid to sorting the wool and it is luck rather than design that brings out subsequent pieces that even approximately duplicate those first made. Most of the goods produced are of ordinary type—cassimeres, cheviots, an occasional knickerbocker effect, friezes, and overcoatings. Owing to the difficulty of obtaining uniform cloths from abroad, the local mills have supplied the fabrics for the uniforms of the Army, police, railway employees, and others, but the cloths are very different from those formerly used for these purposes. Samples of the uniform cloths, with details as to construction, cost, etc., are forwarded with this report, as well as a number of the fabrics made for the regular civilian trade. Some of these are creditable in appearance, but there is much criticism as to their wearing qualities, particularly in regard to the fact that the garments do not retain their shape for any length of time.

Plans are well toward completion for the installation of a strictly modern plant near Valparaiso. The machinery will be entirely American. The installation will be a well-balanced four-set plant with 20 looms and a production of approximately 3,000 yards per week, according to the type of goods in process. It is understood that another plant is under consideration for Punta Arenas, but the plans are not yet definite.

There is an excellent market in all the cities and towns for serges of various weights and qualities, as well as for worsteds. Nearly all the worsteds are clear-finished, with well-defined patterns and in rather neat designs. Few of the offerings are of the loud type commonly seen in some of the other Latin countries, and the patterns and colorings adapted for the American market would probably prove acceptable in Chile. American woolens have not been aggressively marketed here and relatively few of the merchants or tailors have any conception of the variety and excellent quality of the fabrics that may be obtained from American manufacturers. This ignorance of American goods, however, is likely to be remedied, as the difficulty of obtaining goods from European countries will force the merchants to turn their attention to American markets. Until very recently no attempt has been made to create a demand for American goods in these countries and it will require some effort and propaganda work to introduce them. The climate is mild, even in midwinter, in the central section of the country, where the greater part of the people are to be found, so that no special materials are required, the regular American light and heavy weight cloths fitting in with the needs of the merchants.

Unfinished worsteds are used considerably, as are cheviots, but relatively few of the lighter shades of bannockburns and twist cloths are seen in the shops. In cassimeres the hard-finished types are most favored, few of the softer-finished cloths finding a ready sale. Mixtures are not so popular as in the United States, but there is a good market for the finer, neater effects, such as pin checks and four and four checks in the darker shades.

The quotations on woolens seem high, but there are heavy expenses connected with their importation, and in addition it seems to be the general practice to put high prices on the merchandise without much regard to cost. Usually the prices are about double the invoice cost and in some instances even more. Clothing is much more costly than in the United States. The ordinary price of a business suit is 200 to 250 pesos ($52 to $65)—a suit that could be bought from a tailor in most American cities of 50,000 or less for $35 to $45 or in a clothing store from the line of some of the best manufacturers for $25 to $30. A glance at the list of samples that accompanies this report will give a good idea of the prevailing prices and the margin between cost and selling price.

IMPORTS.

The following table shows the imports into Chile of the principal articles of wool in 1913, 1914, and 1915:

Woolen goods.	1913	1914	1915
Sheep's wool	$110,642	$196,770	$43,950
Alpaca	19,270	17,337	15,324
Thread and yarns	555,215	368,174	65,500
Carpets and rugs	250,249	134,623	45,636
Carpeting	243,686	92,835	26,909
Astrachan	33,113	30,343	3,316
Bayeta	172,092	115,089	51,932
Socks	43,538	35,821	10,617
Embroidery	14,350	800	661
Hat shapes	211,078	81,012	127,642
Table covers	15,354	10,482	3,066
Cassimeres	2,895,346	1,803,820	645,826
Cassimeres with silk stripes	31,480	20,456	8,301
Curtains and blinds	12,026	4,225	2,011
Flannel	28,387	13,705	3,659
Blankets	105,658	70,886	11,143
Dress goods and linings	1,143,805	919,539	412,843
Dress goods and linings, part silk	41,796	31,065	7,802
Manta cloth	38,171	21,679	658
Coarse blanket fabric	17,053	92	....
Caps	44,636	27,587	12,938
Saddle cloths	14,969	3,485	1,711
Mantas, ponchos, and mufflers	31,317	7,630	2,246
Stockings	29,085	25,837	6,239
Shawls, neckerchiefs, blanket shawls	321,658	110,480	41,888
Passementerie	20,320	10,519	2,520
Hats:			
Men's and boys'	441,477	318,566	149,025
Women's and girls'	26,331	15,958	4,463
Plush and velvet	11,173	8,362	4,051
Knit goods:			
Clothing	43,445	56.838	11,364
Underwear	127,198	114,152	25,869
Other	108,270	75,715	17,705
Mantos	12,216	5,228	2,593
Molleton	2,964	18,604	3.308
Underwear (exclusive of knit goods)	2,037	6,347	1,883
Waste	....	7,808	4,763
Felt:			
For clothing or for table covers	11,233	4,196	407
For carpet padding	12,718	9,325	2,769
For saddle cloths	59,620	46,209	9,067
Filters	2,225	8,173	143
Bunting	10,473	6,206	311
Clothing:			
Cut out, not sewed—			
Wool	30,866	9,962	4,417
Part silk	12,968	871	554
Ready-made—			
Men's and boys'	208,994	160,731	94,697
Women's and girls'	324,048	208,493	62,026
Waterproof clothing, sewed and not sewed	5,944	7,179	2,935
Tapestry and curtain materials	6,830	2,316	2,000
All other articles	72,891	47,423	17,117
Total	7,978,215	5,293,003	1,975,805

The largest item in the imports of woolens is cassimeres, the total imports for 1913 amounting to $2,895,346, of which the United Kingdom supplied goods to the value of $1,924,406, Germany $526,-750, France $122,088, Italy $82,506, Belgium $226,146 and the United States $236. Next comes the "cloth for dresses or linings," amounting to $1,144,000, in which the United States has no share, Germany furnishing $437,631 worth and England $398,575 worth, France occupying third place with shipments of the value of $235,632. The bayeta trade is practically a monopoly, English mills supplying $164,719 worth out of the total imports of $172,000. According to the statistical report the United States supplied $902 worth, which is apparently an error in classification, as American mills do not compete in this cloth, or at least evidence of such competition does not appear in the statistics of the other west-coast countries. The reason for the lack of competition is difficult to determine, unless it is that none of the American mills makes special fabrics for the export trade and that bayetas similar to those required by the west-coast countries are not marketed in the United States. The carpet trade is in the hands of German and English manufacturers almost entirely, as is also the hosiery and knit-goods trade. England supplied three times as many socks and twice as many stockings as Germany; the latter country supplied almost twice as much as England in undershirts and drawers The yarn imports amount to more than $500,000 a year and this has been a German monopoly, probably owing, to a great extent, to the fact that the knitting mills, the greatest consumers of yarn in the country, are owned or managed by Germans.

The distribution of the trade among the principal sources of supply is shown in the following table of imports for 1913, by articles and principal countries:

Woolen goods.	United Kingdom.	Germany.	France.	Italy.	United States.	Belgium.
Thread and yarn	$19,233	$509,849	$7,234	$14,492	$6	$1,816
Carpets and rugs	104,150	109,841	17,315	587	15,024	2,655
Carpeting	190,413	23,169	16,871	278	8,256	4,582
Astrachan	21,734	10,707	671	....	....	....
Bayeta	164,719	2,189	3,324	947	902	....
Socks	29,215	10,119	3,402	167	15	162
Embroidery	13,796	510	26	....	....	....
Hat shapes	293	28,919	304	172,192	....	8,090
Table covers	3,294	9,471	1,842	412	....	....
Cassimeres	1,924,406	526,750	122,088	82,506	236	226,146
Cassimeres with silk stripes	27,100	2,552	828	....	....	....
Curtains and blinds	6,060	5,170	544	37	179	....
Flannel	11,257	11,373	4,597	....	2	1,158
Blankets, bed	38,837	53,373	6,774	1,407	543	405
Dress goods and linings	398,575	437,631	235,632	5,917	....	62,894
Dress goods and linings, part silk	16,447	7,785	16,255	515	....	761
Felt:						
For table covers	3,808	6,719	705	....	....	....
For carpet padding	10,570	1,691	400	....	50	....
For saddle cloths	5,864	50,017	2,215	220	64	1,240
Filters	140	2,029	53	3	....	....
Fringes	403	5,061	396	117	....	....
Manta cloth	4,374	33,571	226	....	....	....
Tapestry and curtain material	2,935	3,025	324	....	....	....
Coarse blanket fabric	1,018	11,381	690	3,964	....	....
Caps	23,117	11,709	5,364	1,264	....	61
Gloves	1,024	1,686	427	....	....	185
Bunting	9,962	587	194	....	....	....
Saddle cloths	926	12,646	136	....	21	316
Mantas, ponchos, and mufflers	4,425	19,618	1,585	587	....	4
Mantos	3,844	2,204	3,119	613	....	149
Mantos, part silk	1,629	....	460	118	....	....
Stockings	17,427	8,805	1,107	186	141	396
Shawls, robes, etc	16,685	237,514	5,474	26,274	166	957
Passementerie	1,276	12,783	4,820	1,434	7	....
Hats:						
Men's and boys'	70,261	91,734	31,531	227,744	1,932	2,120
Women's and girls'	4,236	3,509	14,925	2,503	....	62
Molleton	512	1,513	938	....	....	....
Billiard cloth	1,515	3,241	1,241	....	7	1,496
Plush and velvet	1,132	9,884	131	....	26	....
Underwear (exclusive of knit goods)	1,171	721	127	....	17	....
Waterproof cloth	798	1,475	502	....	....	....
Knit goods:						
Clothing	11,010	20,204	8,902	482	219	1,661
Underwear	38,313	71,099	10,384	3,200	1,034	1,832
Other	14,704	59,290	21,583	6,782	22	1,682
Clothing:						
Not sewed—						
Wool	3,443	527	26,551	....	....	34
Part silk	5,804	1,274	5,890	....	....	....
Ready-made—						
For men and boys	116,655	59,330	26,75[illegible]	3,966	804	569
For women and girls	66,668	80,972	168,097	6,404	110	1,439
Waterproof clothing, sewed and not sewed	3,428	1,626	789	....	140	....
All other articles	16,385	27,298	8,573	1,933	1,608	736
Tota	[illegible],434,991	2,604,151	792,321	567,251	31,531	323,919

The reason for the small amount of woolen goods imported from the United States may be stated briefly as lack of effort. Making a market for the finished product is often more difficult than converting the raw material into first-class merchandise, and doubtless more manufacturing establishments fail through lack of ability to make a market for their wares than through lack of technical ability on the part of the manufacturing department. Successful merchandising presupposes that the selling department has given the manufacturing end a correct idea of the requirements of the market, the type of goods needed, the general trend of styles and colorings, weights, and prices. In addition, the selling end of the business must have a sufficient organization to care for the distribution, composed of men who are familiar with the trade and its needs. It is in this particular that American manufacturing establishments are deficient. There is no question as to their ability to produce goods of the first order, but they lack a distributing organization—a defect that must be remedied if any serious attempt is to be made to obtain Latin-American trade.

WOMEN'S WEAR CLOTHS.

No data are given in the statistics as to the amount of the various kinds of goods brought in, aside from bayetas, so that it is impossible to form an accurate estimate of the extent of the market for each type of goods. Naturally, this changes more or less from season to season, as it does in the United States home trade, and figures that represent the consumption for one season would not be of special value in another except to show in a general way the trend of the market, the relation of the style changes to the vagaries of fashionable cloths in the trade of the United States, and, what is perhaps of as much importance as any other factor, whether or not the cloths made by American manufacturers are adapted to the requirements of the Chilean merchants. With a view to gaining light on the last question, visits were made to most of the leading dealers in dress fabrics, and considerable time was spent in looking over the stocks to form an idea of the most salable types of fabrics.

Prominent in the assortment of every merchant are various types of serges, the low grades for those with limited means, including the types known in American markets as storm serges, the better grades made from three-eighths or half-blood wools or even better qualities, and fine French serges. Serges are probably the best sellers through the country. Gabardines also are much in favor, the assortments in most of the larger stores being complete as regards both qualities and colorings. Broadcloths are not used extensively in this country, but there is an excellent demand for velours in the delicate shades and in both stripes and checks, similar to those shown in the New York market for the 1916 season. Many of these are shown in small square checks and others are in checks an inch square or even larger, with overplaids, and still others are plaids of two, three, or four color effects.

In the lighter cloths, voiles and etamines are standards and nun's veiling is sold in large yardages. A fine fabric with an inch border is used for making the manto, a head covering worn almost universally by the poorer class of women, and to some extent by those who are in more comfortable circumstances, through the latter frequently wear lace rather than woven goods. For winter wear there is a good demand for fancy dress goods, the small checks, stripes, and mixtures in clear-finished worsteds. Woolens are in little request at times because of changes in style, just as they are in American markets.

Bayetas are not so prominent in this market as in Peru and Bolivia, though a considerable yardage is sold; all goes into the interior for use by the Indian population. Knit goods are not imported in large quantities, the local mills taking care of a good share of the demands, particularly in the lower grades of materials. Woolen underwear is not extensively used; the cheaper cotton-fleeced goods fill its place. Woolen hose are used by relatively few.

LINEN-GOODS TRADE.

The total imports of linens for the year 1913 were $466,000, but they declined in greater proportion after the outbreak of the war than the imports of other textiles, till in 1915 they were only about one-third of the normal total. The share of this trade falling to the United States was relatively small, in 1913 amounting to only $3,559, less than eight-tenths of one per cent of the total. The United States does not produce the raw materials required in this industry, and is therefore not in a position to compete with some foreign countries for the world trade nor indeed to supply its own wants. The following table of imports of linen goods into Chile in 1913, 1914, and 1915 shows no item of paramount importance:

Linen goods.	1913	1914	1915
Damask, table	$20,347	$6,949	$4,244
Embroidery, with silk, cotton, or woolen threads	1,423	912	289
Shirting (bramante, crea, and crehuela)	16,632	7,082	5,095
Sheeting, batiste, and chambray	12,465	5,697	5,455
Drill and brin	48,101	20,340	10,194
Socks	1,406	2,505	1,099
Shirts	9,643	11,070	3,136
Table covers	3,027	401	296
Corsets	1,660	1,398	105
Curtains and blinds	5,970	1,708	2,513
Ticking	15,254	3,934	2,797
Laces	5,296	3,995	1,718
Buckram	45,528	32,651	17,254
Kitchen toweling	4,617	1,484	1,432
Curtain and tapestry material	3,581	1,002	911
Gloves	1,814	1,078	776
Duck:			
For sails	27,717	30,244	17,819
Other	22,548	10,477	4,161
Hose	4,844	1,055	1,812
Table cloths and napkins	37,052	19,739	7,961
Towels:			
Hand	3,827	2,602	1,647
Kitchen	9,628	3,408	2,103
Handkerchiefs	15,711	8,044	6,758
Passementerie	3,952	3,038	1,013
Collars and cuffs	29,353	22,311	12,530
Thread and yarn:			
For sewing or darning—			
Skeins	317	473	70
Spools	16,419	9,725	7,345
For sewing sacks or sails	2,682	1,437	572
For knitting, embroidering, or marking	530	714	5,453
Clothing:			
Not sewed, for men and women	1,338	396	....
Ready-made—			
Men's and boys'	589	234	227
Women's and girls'	10,954	1,835	988
White apparel	11,229	6,944	2,266
Bed linen	25,737	17,192	6,135
Velvet and plush	25,751	17,669	1,326
Awnings and tents	1,063	5,139	2,692
All other articles	10,532	15,188	1,023
Total	466,224	286,699	144,672

The most important single item in the list for the normal year was drill and brin, the latter a rather coarse cloth used for the making of men's and boys' clothing, usually in a fancy-woven fabric; next to this comes buckram, a cloth used for interlining in both men's and women's garments. Tablecloths and napkins are third in the list but are far less than the imports of similar goods in cotton, which have superseded linens to a marked extent because of their lower prices. Among the well-to-do class there is a ready sale for the better types of merchandise, but a large majority of the people are obliged to husband their resources with care and their wants must be subordinated to their means, so that the lower-priced and from some standpoints the less desirable article must be purchased.

The following table shows the imports of linen goods in 1913, by principal articles and principal sources of supply:

Linen goods.	United Kingdom.	Germany.	France.	Italy.	United States.	Belgium.
Damask, table	$3,865	$9,038	$5,681	....	$15	$1,678
Embroidery	248	1,139	36	....	....	....
Shirting	4,780	3,724	5,101	$77	....	2,663
Sheeting, batiste, and cambray	8,453	727	2,213	187	....	155
Drill and brin	25,333	12,333	7,788	875	....	1,652
Shirts, men's	5,917	2,965	761	....	....	....
Socks	201	53	1,148	....	4	....
Table covers	602	1,232	978	....	....	....
Mattresses	404	243	111	....	172	....
Corsets	157	242	355	....	829	76
Curtains and blinds	350	5,285	296	....	....	22
Ticking	1,453	6,847	502	....	....	6,452
Laces	1,755	3,146	212	182	....	....
Buckram	21,603	11,016	9,860	127	....	2,902
Kitchen toweling	1,422	1,347	1,337	243	....	268
Curtain and tapestry material	1,153	1,084	668	....	....	506
Gloves	285	1,325	37	168	....	....
Duck:						
For sails	26,393	1,234	....	....	89	....
Other	4,990	15,674	550	3	488	838
Hose	3,015	741	....	349	739	....
Tablecloths and napkins	10,751	11,779	11,896	1,892	6	15
Towels:						
Hand	1,649	1,533	374	175	23	73
Kitchen	3,044	2,764	1,177	165	....	2,478
Handkerchiefs	8,595	2,964	3,373	....	....	775
Passementerie	1,127	2,521	273	....	....	31
Thread and yarn:						
For sewing or darning—						
Skeins	98	201	18	....	....	....
Spools	6,382	6,958	349	219	....	2,512
For sewing sacks or sails	1,525	1,082	75	....	....	....
For knitting, embroidering, or marking	22	455	31	22	....	....
Clothing:						
Not sewed, for men and women	45	71	1,218	....	....	....
Ready-made—						
Men's and boys'	44	337	114	....	95	....
Women's and girls'	2,364	1,960	5,774	561	50	139
White clothing	7,614	1,919	1,406	16	....	94
Collars and cuffs	19,936	5,228	3,087	188	825	47
Bed linen	2,598	3,128	15,832	3,655	9	27
Velvet and plush	5,849	14,410	3,860	....	....	1,632
Awnings and tents	596	....	201	....	....	....
All other articles	7,209	4,645	3,573	172	201	286
Total	191,827	141,350	90,265	9,276	3,559	25,321

Collars and cuffs were supplied almost entirely by Great Britain, Germany, and France, the dealers making the claim that the goods from those countries are superior to the American, as they retain the shape better during the severe treatment given them in the laundry. In the table of imports for the three years two items of table linen appear, the first differentiated as damask. This item is goods known in this market as "alemaniscos y damascos," all colored goods, while the goods under the heading "tablecloths and napkins" are all white goods. It will be seen from the relative amounts of the imports under each heading that colored table linen is used in Chile more than in the United States.

Much of the bed linen is imported in the shape of the finished goods, made-up sheets, pillow cases, etc., the total brought into the country in this form amounting to twice the imports of sheetings in the piece. Linen ticking is favored by those whose means will permit of its use, the imports amounting to $15,000.

JUTE AND HEMP GOODS.

In the imports of jute, hemp, etc., one item alone accounts for more than three-quarters of the total—sacks of various kinds, mostly direct from India, the principal source of burlaps and burlap bags. Sacks are used very extensively for packing many classes of merchandise and a great number are required in the nitrate trade, as well as for shipping metals, flour, grain, and other commodities. Imports into Chile of jute, hemp, etc., and their manufactures for 1913, 1914, and 1915 are shown in the following table:

Jute and hemp goods.	1913	1914	1915
Jute and hemp	$16,730	$13,004	$4,099
Yarn and thread	239,496	196,421	70,099
Raw material for rope	3,980	679	....
Carpets and rugs	16,294	7,027	2,529
Packing cloth and osnaburgs:			
For making sacks	158,968	100,228	92,492
Other	837	3,491	1,853
Hemp or jute bags	2,233	765	82
Horse blankets	2,493	311	536
Webbing	7,692	3,781	529
Hemp packing	1,786	1,215	734
Oilcloth and linoleum	112,547	58,779	29,227
Mats:			
Door	8,670	10,168	2,424
Floor	7,449	2,185	1,743
Embroidery canvas	2,237	357	....
Buckram	20,714	20,939	18,624
Coarse suitings	11,072	9,026	2,380
Rope or tackle	152,689	112,866	103,262
Canvas and duck	21,697	17,187	6,310
Hose	4,424	3,666	2,177
Shoe soles	4,069	958	....
Twine, tarred or not	8,710	6,897	3,039
Nets, fish	4,030	2,006	....
Sacks, empty	2,918,729	1,811,407	2,335,101
Sack for metals:			
Fine	....	....	2,674
Other	196,902	80,177	96,542
Awnings and tents	4,617	1,165	1,697
Carpeting	3,462	1,393	37
All other articles	13,133	12,557	6,000
Total	3,945,660	2,478,655	2,784,190

Raw materials are not imported in large volume because there are no manufacturing establishments that require them. Considerable quantities of yarns and threads are consumed annually, a large part of the yarns going into the making of rope soles for alpargatas, the footwear of the poorer classes and a large number of the Indians. The United States has a very small share in the trade in these materials. The raw materials are not produced in the country and countries in which labor is cheaper have a decided advantage in importing the raw material, manufacturing it, and exporting it in the shape of finished goods. The classification osnaburg would appear to be a misnomer, as a considerable share of the total receipts is from India, a country that is not in a position to export this class of material, and investigation leads to the conclusion that the merchandise is really burlap to be used in the manufacture of sacks. Great Britain supplied $91,985 worth and India $42,413 worth; about $16,000 worth was divided among the other sources of supply, the United States furnishing but $737 worth. In the yarn trade the United States had a larger share, $55,110, against $117,790 for the United Kingdom and $38,449 for Germany. The trade in sacks was practically monopolized by the United Kingdom, India, and Germany. The United Kingdom and India supplied goods to the value of $3,023,284, India's share amounting to $2,813,746.

There is little reason to believe that the American share of the trade in articles made of hemp and jute will increase to any considerable extent, as other countries have a great advantage in the lower prices of raw material and the smaller cost of manufacture.

The following table shows the imports into Chile in 1913 of the principal articles made of hemp and jute from the most important countries of origin:

Jute and hemp goods.	United Kingdom.	Germany.	France.	Italy.	Spain.	United States.
Jute and hemp	$9,047	$249	$402	$430	$6,597	$7
Yarn and thread	117,790	38,449	382	9,314	169	64,674
Raw material for rope	...	540	...	3,428	...	7
Carpets and rugs	3,293	9,727	1,353	1,210	90	38
Packing cloth and osnaburgs:						
For making sacks	91,985	13,089	188	...	...	737
Other	569	12	254	...	...	2
Hemp or jute bags	361	1,805	3	...	...	57
Horse blankets	1,268	1,056	142	...	...	...
Webbing	294	4,392	1,333	54	...	46
Hemp packing	778	1,008	...	...	...	...
Oilcloth and linoleum	77,782	26,099	3,611	...	...	1,005
Mats:						
Door	4,553	2,679	177	9	522	155
Floor	1,082	410	93	...	14	225
Embroidery canvas	...	2,237	...	...	...	...
Buckram	16,287	2,247	446	...	28	274
Coarse suitings	6,936	3,581	288	...	...	205
Rope or tackle	113,477	16,001	976	3,636	...	17,541
Canvas and duck	18,338	2,395	388	...	122	162
Hose	1,349	2,982	91	...	...	...
Shoe soles	...	...	3	...	4,066	...
Twine, tarred or not	3,133	1,813	264	3,217	...	251
Nets, fish	2,691	1,155	7	136	41	...
Sacks, empty	174,179	24,652	7	...	...	...
Sacks for metals	35,359	60,371	...	...	...	...
Awnings and tents	3,962	277	...	...	...	377
Carpeting	2,165	1,059	211	...	28	...
All other articles	5,132	4,069	2,058	622	356	860
Total	691,810	222,354	12,677	22,056	12,033	86,623

IMPORTS BY PARCEL POST.

There is considerable importing, by both firms and individuals, by means of the mail, Chile having a parcel-post agreement with most of the countries in the Postal Union. [The parcel-post convention between Chile and the United States was recently suspended.] Under normal conditions parcels weighing up to 11 pounds and not exceeding 1,525 cubic inches can be sent through the mail, and many people avail themselves of this method of obtaining goods, even ordering whole pieces of cloth at times. Much of the business in smaller articles required in small quantities is accomplished by parcel post, and there are large imports of personal effects by individuals. In 1913 the postal imports of cassimeres alone amounted to over $10,000, and of woolen knit goods and hosiery over $15,000 worth was imported through the mails. The cotton-goods schedule shows more than $47,000 worth of ready-made clothing imported through the mails, and over $41,500 worth of passementerie, $48,000 worth of knit goods, shirts, and gloves, and $54,000 worth of laces and veilings. Many other sections of the schedule show postal imports smaller in amount but sufficient to indicate that the trade accomplished in this way is well worth making an effort to obtain.

Goods brought in by post are required to pay the usual duties but most other charges are avoided, and the delivery is usually much quicker. Many of the smaller importers and retailers are availing themselves of this method of obtaining a portion of their requirements, and as a result parcel-post imports are increasing very materially. In fact, these imports are encroaching to a considerable extent on the business of the larger importing houses. The countries of origin of parcel-post imports are not given in the statistics, but from the fact that many French and English exporters furnish attractive catalogues of their goods, well-illustrated and printed in Spanish, it is natural to suppose that a large share of the trade is obtained by those countries.

IMPORTS AT PUNTA ARENAS.

The southernmost port of the country, Punta Arenas, located in the Straits of Magellan, is the capital of the Territory of Magallanes and has a population estimated at 20,000. A cold, barren, and sparsely inhabited section separates the port from the rest of the country, and its comparative isolation was probably the reason for making it a free port. At present only a limited number of articles are subject to duty. The imports of textiles are not of great importance, the figures for 1913 showing that less than 4 per cent of the country's imports entered through Punta Arenas. As a point of departure for the products of the country the port is not of major importance, the total exports for the same year amounting to a little more than $4,000,000, of which over 99 per cent were animal products, meats, hides, whale oil, a small amount of wool, etc. Since the climate in this section is cold, the textile imports are largely woolen materials, which usually amount to double the imports of cottons.

TEXTILE MANUFACTURING.

The manufacturing industries have not reached so advanced a stage of development in Chile as in some of the other countries, particularly Argentina and Brazil. No attempt is made in Chile to produce the finer goods in either cotton or wool. Accurate statistics are not available as to the amount of capital invested in the various textile enterprises nor are data given as to the number of looms in the weaving mills or of knitting machines in the hosiery and underwear plants. Partial data are furnished by the report of the Sociedad de Fomento Fabril as to the location of the plants and the Sinópsis Estadística supplies additional information, but with both these publications at hand it is impossible to gain a clear idea of the amount of manufacturing carried on in the Republic. According to the latter publication there were, in 1915, 26 textile establishments employing 2,267 persons and 2,202 horsepower. The capital invested was 14,696,329 paper pesos,[a] cost of raw materials 5,504,334 pesos, wages and salaries 2,333,298 pesos, other expenses 254,449 pesos, and the value of the products 10,794,251 pesos. The wage earners were 443 men, 1,437 women, and 218 children, and there were 169 men in salaried positions. The cost of production is subdivided as follows: Cost of fuel, native, 168,811 pesos, foreign, 128,920 pesos; raw material, native, 1,935,018 pesos, foreign, 3,271,585 pesos; rent, permits, insurance, etc., 254,449 pesos; salaries, 603,819 pesos; wages, 1,729,479 pesos.

A basis of comparison of wages is afforded by the figures obtained at the Caupolican mill at Vina del Mar, owned and operated as a subsidiary of an American company, which sells the goods. This is a 150-loom plant that does weaving and finishing only. The weavers operate two looms each on checks and plaids, earning about $7.50 per week, the fixers on sections of 50 looms earn $13.50 weekly, the winders, each operating 15 spindles, $4. The weaving equipment consists of 80 circular box looms, 40 dobbies, and 30 plain looms of various widths—ten 74-inch, forty 64-inch, twenty 36-inch, eighteen 45-inch, and sixty-two 62-inch looms. Other 60-inch looms are now on order and will be put in operation within a short time. The warping mills are four English and one French, the spool winders one German and one English, with an additional English machine on order, and the bobbin winders five English and one German.

In the same town are another cotton mill owned by a Belgian concern and a silk mill owned by an Italian firm, the latter making dress silks largely. A second silk mill is located in Santiago, manufacturing knit goods, mostly silk-and-wool mixtures. The Sociedad Anónima Establecimientos Americanos Gratry, mentioned as the second cotton mill in Vina del Mar, makes a wide variety of ginghams, oxfords, cotton damasks, casinetes, and other materials. Though dress silks, taffetas, grosgrains, etc., are the chief business of the Manifatturas Canziani, the mill turns out a fair yardage of ribbons and devotes a part of the production to voiles and other diaphanous cloths.

The knitting industry is better represented than any other branch of the textile trade, with 11 mills of various sizes. Some make only hosiery and others combine the hosiery and underwear business. The Fabrica Victoria de Puente Alto is one of the most important in the country in this line and produces underwear, sweaters, and hosiery for men, women, and children.

The woolen industry has not interested much capital, there being but three small mills in the country, none of them with modern equipment. Two of the mills are under German management and were not visited. The most important is the Sociedad Nacional de

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[a] For the exchange value of the paper peso, see page 47.

Tejidos "Santiago," at El Salto, a suburb of Santiago. In this plant are manufactured all sorts of cassimeres, overcoatings, cloakings, cheviots, and uniform cloths.

There is a small mill at Tome with 12 looms, engaged in the production of various grades of cassimeres. This mill is fitted with English machinery; the cards have lap feeds between the units, and a single doffer is used on the finisher, with steel dividers for separating the web into sliver for the condenser. Why this type is used on the stock ordinarily worked is more or less of a mystery, as much better results would be obtained by a finisher with ring condensers such as are common in the United States. This concern is now in the market for sufficient machinery to double its equipment but is anxious to obtain the type of auxiliary feeds and condensing that is already installed. The mill buildings are modern in every respect and the power is furnished by a never-failing stream of water, which might be developed to supply power for ten times the machinery now operated.

During the last two years there has been no little discussion relative to nationalizing the industries of Chile and various projects have been considered, among them that of forming a large company to undertake the erection and operation of a woolen mill to supply the uniform cloths required by the Government. An elaborate prospectus was issued with figures tending to show that the profits of the enterprise might be expected to reach 99.73 per cent under present conditions and should without any reasonable doubt amount to 47.24 per cent normally. The enterprise, however, has not met with the expected response from capital. It was anticipated that a considerable portion of the stock would be purchased by Army officials and those connected with the Government, so that the concern would receive at least a goodly share of the orders for uniform cloths. Copies of the prospectus, which will make very interesting reading for any woolen manufacturer, accompany this report.

FACTORS AFFECTING TRADE.

The great majority of the importing houses are owned and managed by foreigners, very few Chileans engaging in this branch of the business. English and German concerns have been preponderant in the trade for many years, and this accounts in great measure for the larger volume of business obtained by those countries. Two American importers are established in Chile but no American retail concern, while there are many German and British houses, not only in the textile trade but in many other lines.

The textile import business is entirely in the hands of foreigners. The predominant position of England in the import trade may be attributed to the influence of the loans made by that country to Chile, the enormous investments of English capital in railroads, mines, the development of the nitrate industry, and commercial enterprises. Many of the principal importing concerns in the country are English and the largest department store is under English control, while may of the smaller stores are owned or managed by Englishmen. Naturally these houses purchase most of their goods from sources with which they are familiar and have long-established connections. The establishment of an American house specializing in textiles, suggested by a prominent retailer, would do more toward increasing the American share of the business than any other single factor. No special effort is being made by importers to push the sale of American goods; sales are resulting from the difficulty of obtaining supplies elsewhere or because of the obvious superiority of the merchandise.

The members of the various foreign colonies also have a very perceptible influence on the trend of trade, as each of them has a preference for the type of merchandise to which it has been accustomed. Though in many cases the products of other countries may be better from some standpoints, familiarity with the article from the home country overbalances other considerations and a demand is created for certain articles. These articles are easily sold, and the merchant follows the line of least resistance, disposing of the goods that require no effort to introduce rather than seeking to make a market for comparatively little-known products. The Latin, too, is rather conservative in his attitude toward new goods or methods and it requires no little effort to wean him away from old customs, familiar brands, and established connections. This feature has its advantages, however, as once thoroughly convinced of the superiority of an article he is not easily induced to change for another "just as good," nor is price the all-important factor in his negotiations. The margin of profit is sufficiently large to permit him to pay a trifle more for the desired merchandise rather than to substitute an unknown brand, even though it may be superior.

Mention has been made of the complaints arising from the attempt to force the merchants of foreign countries to adapt themselves to American methods of conducting business rather than adapting American practices to conform in some measure to long-established foreign customs. It would be better for the few exporters to make concessions than to attempt to introduce new methods to the entire continent of South America. To-day there is not the excuse for demanding New York credits that existed when it was practically impossible to gain any definite information as to the standing of the foreign buyer. There is certainly no shadow of excuse for one of the practices frequently and bitterly complained of by the importer, that of substituting without consulting the purchaser; for no matter how well-intentioned the shipper may be, it is not at all likely that he has sufficient familiarity with the market requirements to permit him to make a wise choice. Foreign manufacturers are much more willing than American to accept suggestions from their clients and to carry them out even to the most minute particulars. Changes in length of pieces, construction, or finish are made if by means of such changes the market conditions can be met more fully, while in the majority of instances American manufacturers would deem it impracticable to make the charges desired, for the small yardage needed by the individual customer, forgetting that the new cloth would probably meet the requirements of a large number of his foreign clients.

The matter of arbitrary assortments is mentioned by every importer when questioned about purchases of prints, flannelettes, ginghams, and many other types of goods. The practice of the American mill to make to stock is of course the reason for this practice and to overcome the difficulty entirely would perhaps be almost out of the question; but as long as the importer can get what he wants in the way he wants it from foreign makers and can not obtain it from American manufacturers, it will take salesmanship of a high order to prevail on him to place orders for such goods with American firms.

MERCHANDISING METHODS.

Various methods of entering foreign markets may be employed, any of which may be the best for certain lines. For a large, strong concern an excellent means of gaining foreign trade, whether in Chile or any other country, is to organize an efficient export department and canvass the market thoroughly, sending out salesmen who are familiar not only with the business but also with the Spanish language. Even better, if the business is of sufficient size to warrant the expense, would be the establishment of branch houses in a few of the larger centers of distribution, where a certain amount of stock could be carried. Immediate delivery of part of the order would thus be assured and the customer would have an opportunity to gain a clear idea of the appearance of the stock delivery. There is ample opportunity for a progressive American house to build up an excellent business in textiles in Chile and other west-coast countries, but at present there is not a single house of this character from Panama to Cape Horn.

To gain foreign business through an export commission house is a rather difficult task unless the goods are palpably superior at the price. One of the disadvantages in this method of operation is that the customer becomes the client not of the manufacturer but of the selling house, and the latter can readily make a change in the source of supply, so that the manufacturer has no assurance of the permanence of his business, For the small concern that is unable to finance a selling campaign, however, the export house is probably the best means available for entering foreign markets. In this way all questions of credits and collections are eliminated; the export house usually pays for the goods spot cash or on very short terms, and generally attends to all details of packing and shipping.

A resident agent has some advantages over the traveler; he is always on the ground and in a position to take advantage of changes in the market conditions and also to keep his principals informed as to requirements. He should have more freedom of action than is usually given a commercial traveler in the matter of extending credits or adjusting differences that are certain to arise from time to time. The question as to whether or not he should be sent from the home office is one that needs considerable thought; his familiarity with the business methods of the concern, if sent from home, would of course be of no little value to him, but a man who has had experience in the field and has gained the confidence of the importers will probably succeed in obtaining a larger share of the business in a short time than a stranger. The only means the client has of making his estimate of the concern is the representative with whom he comes in contact, and for this reason great care should be exercised in choosing the right person. In some instances excellent results have been obtained from foreign houses representing American concerns, but in many cases there have been disappointments in the amount of business secured. If such means of representation is decided on, the house should be carefully investigated and its lines known, or it may be that the carrying of similar lines from its home manufacturers will simply mean the bottling up of competition. Such cases are by no means rare. Instances might be quoted of American goods being shown only when the dealer is practically forced to display them rather than lose a sale.

PACKING AND MARKING.

Goods destined for Chile, in common with those for all other west-coast countries, must be packed with a view to withstanding the exceedingly rough handling to which they are sure to be subjected in loading and discharging, as well as the risk of pilfering. American exporters and manufacturers have heard tales of poor packing for so long that it would seem unnecessary to add another word to the volumes already written. There are a few details, however, that properly belong with a discussion of the textile markets, and attention to the following suggestions may assist in remedying some of the common causes of complaint. There is much less ground for criticism of American packing at present than there was a few years ago, and, as a general thing, American shipments are as well packed as those from any other country. In listing the various countries according to the superiority of their packing there is little doubt that the United States would stand second at least, and importers in certain lines do not hesitate to place American exporters at the head of the list. Several American houses send out cases that would serve as models and could not be found fault with by the most exacting critic. Attention to the details of packing on the part of a few who are notably lax in this regard would easily place the United States in the first place.

Complaints of the goods ordinarily forwarded in bales are conspicuously absent, but cases are occasionally made of material that is not strong enough to withstand the severe treatment accorded them by stevedores, who have no regard for case or contents. None of the ports are provided with docking facilities, so that the goods are discharged into launches and from launches to the wharves. They are not only handled twice, but they run additional risks through the heavy swells that are frequent at many of the ports. Most of the boats on the west coast are provided with side entrances to the hold, instead of center hatches, and the booms are practically stationary. The method employed in discharging is to place a sling around a case, start the winch, and let the case swing outboard over the launch, slack off the line, and let the case drop into the launch, none too gently. Few trucks are in use at any of the ports and if the case is not too heavy it is carried on the back or shoulder of a stevedore, who does not ease it down, but simply drops it, whether it contains glass or paper, watches or shoes. The necessity for careful packing is thoroughly impressed on one who has seen a vessel discharging in any of the west-coast ports or the delivery of merchandise to warehouses by carts. The usual method of unloading from the carts is to allow the package—be it bale, barrel, or case—to roll or drop off the end of the cart.

Care should be observed in marking the cases and bales to see that the marks correspond with those on the invoices and shipping documents, as any variation is likely to lead to considerable trouble in clearing the goods through the customs. It would tend to lower the percentage of pilfering if all marks indicating the contents of packages were omitted, so that nothing would appear on the package but the weight, gross and net, the number, and the necessary identification marks. Marking the contents on the outside of the package serves no useful purpose and only tends to increase the probability of thieving.

TRADE-MARKS, SAMPLE BOOKS, AND CARDS.

Trade-mark registration and the maintenance of the brand or name under which merchandise is marketed in Chile should be given careful attention by American exporters and manufacturers. Many of the natives are deficient in education and the device on the goods is the only means of identification for a large proportion of the ultimate consumers. For this reason it is an excellent idea to choose as a trade-mark some word, legend, or design that is easily understood and that will impress itself on the memory without effort. Many importers select as a trade-mark the picture of some animal peculiar to the country, a mountain scene, or other picture that is attractive and simple, or, in default of this, a legend, which, needless to say, is printed in Spanish.

There has been a notable advance in the preparation of sample books and cards supplied by American exporters during the last few years, but there is still opportunity for considerable improvement in this respect. Usually the importers' samples are well gotten up, but too frequently the samples accompanying the goods are not so smart in appearance as those from the European houses, particularly those sent out by the large Manchester concerns. The extra cost would be borne cheerfully by the importers in nearly all cases, and even if the expense must be included in the cost of selling, the returns would amply repay the slight increase in cost involved. It is axiomatic that goods well presented go a long way toward selling themselves, and there is no question that an attractive line of samples is one of the greatest assets that a salesman can have, particularly in these countries, where appearance counts for at least as much as intrinsic worth. In the display of velvets and plushes or other cloths where it is desirable to give the idea of weight and thickness or softness the foreign exporter frequently uses a box of light wood or stiff cardboard about a half-inch thick to prevent the flattening of the goods, and in many cases the goods are so arranged that it is well-nigh impossible to handle them without taking a double thickness between the fingers.

Several sample books were exhibited as models in different houses and comparisons made between those from the United States and foreign countries, usually with adverse criticism of the American books. Those from European countries are invariably made with an attractive cover decoration, a lithograph or half tone, and the goods are well arranged, each succeeding coloring about one-eighth of an inch longer than the one above and with folded edges, so that there are no ravelings to detract from the appearance of the merchandise. The type sample may be the first or the last in the collection, preferably the last, and should be tacked at the ends with colored thread. Many of the books and cards have a medallion toward the bottom of the cover with a sample of one of the best colorings neatly pasted within the colored or gilt border.

These things are trifles, it is true, but no detail is sufficiently small to be considered a trifle that may be neglected with impunity. One of the chief reasons advanced by many importers for the success of one of the leading sources of supply is the minute attention given to the filling of orders precisely in the manner requested by the buyer. Probably the customer knows much better than the exporter the most advantageous method of handling the problems connected with bringing goods into his own country. Any special instructions given should therefore be followed to the letter, as there are doubtless excellent reasons for requests that to exporters may appear unnecessary or ill-advised.

TERMS AND CREDITS.

Long credits, one of the chief inducements offered by some of the competitors of American firms for the export trade, have hindered the development of American commerce with several nonmanufacturing countries. Now, however, instead of the three, four, and even six month terms that were formerly common, the longest terms granted are 30 and 60 days. Many concerns require cash against documents, or acceptance of 30-day drafts, some granting 30 days after arrival of goods. The cotton-goods business in the United States is done on very short time, and it is difficult for the factors in the business to accustom themselves to the requirements of the export trade. Much business is lost that might be obtained if a more lenient policy in regard to terms were followed. Many houses in the United States insist on the establishment of New York credits and cash before shipment, a policy that tends to drive trade to sources where goods may be purchased on more liberal terms. This is in part due to the former difficulty of obtaining credit information; but this obstacle has been overcome to a great extent by the establishment of branches of American banking institutions in several of the larger distributing centers of the southern continent. The information available through the foreign banks was never of the best, the reply to an inquiry from an American source being usually rather perfunctory and given merely as a matter of banking courtesy, while a similar inquiry from a national of the bank would be answered in great detail.

The overextension of credits is undoubtedly an evil to be avoided, but too rigid an adherence to a strictly cash basis or very short term credits is perhaps only a lesser evil that will surely bring in its train some very unwelcome results. The United States is in a position to obtain a much larger share of the Latin-American business than has hitherto fallen to American manufacturers, but the serious consideration of the question of terms is of vital importance if the trade is to be retained after the close of hostilities. American houses are well-nigh unanimous in demanding cash against documents, sight draft against bill of lading, cash with order, or other short credit term, which in the great majority of cases means that the merchant is required to pay for the goods before they are received or, at the most, long before he has had an opportunity to realize on any portion of them. This demand works a hardship on him in nearly every case, as he must give credit to his customer, sometimes for a considerable length of time. It is not probable that the extremely long terms granted by European firms prior to the war will again come into vogue, but it would not be at all surprising if in the struggle for world markets that is sure to come after the signing of peace treaties more favorable terms would be granted by the business-seeking nations of Europe than are conceded by American exporters. In that case the United States would lose the greater part of the increased trade that has come to it as a result of the war. It is folly to close our eyes to the fact that many merchants of the South American countries are anxious to see the war end that they may again trade with the firms that afforded them better facilities for conducting their business. A spirit of cooperation manifested at the present time and a disposition to meet the buyer halfway rather than to require him to come exactly to American terms would mean the salvation of the larger part of the present increased export business with South America.

CREDIT INFORMATION—BANKING FACILITIES.

Facilities for obtaining credit information are vitally important to the exporter and manufacturer. Without accurate information as to the ability of the purchaser to fulfil the terms of his contract negotiations assume too much of the element of chance and the profits are not large enough to permit the risks of loss of collections on a material percentage of the sales. Unfortunately there are no credit agencies operating in the majority of the Latin-American countries, and the only means of securing the required data is through the banks or inquiry from individuals. Until within very few years American exporters have had access to relatively little information that could be relied on as accurate and unbiased. During the last few years conditions have changed very much for the better, with the establishment of branches of American banking institutions in several South American countries. There is no doubt that the facilities afforded by the branches of the strong European banks to the citizens of their repective countries have had great influence in increasing their commerce with the Latin countries, and in several cases the establishment of an American bank in a country has notably affected the trend of trade.

The National City Bank of New York has a branch in Valparaiso, and it is anticipated that another branch will be established in the capital city, Santiago, affording additional facilities for American commerce in the most populous and most prosperous section of the country. Information as to the standing of Chilean importers can readily be obtained and all commercial transactions, collections, etc., can be carried on as readily as with the exporters' local banks. There are six other foreign banks in the country and 22 national banks, 4 mortagage banks, and 5 savings banks, while 15 savings departments are operated in connection with the commercial banks and insurance societies. During the 10 years ended in 1916 there was a great increase in the savings deposits, as is shown by the following figures: In 1907, 23,866,131 pesos; 1908, 30,224,030 pesos; 1909, 32,922,730 pesos; 1910, 39,013,556 pesos; 1911, 53,213,850 pesos; 1912, 71,164,176 pesos; 1913, 93,032,772 pesos; 1914, 111,-

515,809 pesos; 1915, 124,243,177 pesos; 1916, 130,796,523 pesos. The foreign banks operating in Chile are the Anglo-Sud-Americano, Alemán Transatlántico, Chile y Alemania, Germánico de la América del Sur, Lóndres y Rio de la Plata, Mercantil-Bolivia, and National City Bank of New York. The English and German banks maintain offices in several of the larger cities through the country and have agencies in other cities. The most important of the national banks is the Banco de Chile.

DISTRIBUTING METHODS.

Chile offers a strong contrast to the other west-coast countries in regard to the type of stores engaged in the distribution of textiles. The leading cities have excellent department stores. They are well lighted, have well-arranged stocks, and give special attention to effective window dressing. The three principal stores are the Chilean Stores Co., Gath & Chaves, proprietors, who also operate several stores in Argentina; the Casa Francesa, branch of a Paris house; and the Casa Muzzard. All are doing an excellent business and carrying well-assorted stocks of general dry goods, notions, millinery, ready-to-wear garments, shoes, and hats. The first-named concern also has an excellent grocery department. Several of the smaller stores are well organized and arranged, and in general the better class appear much the same as stores of the same size in American cities.

Each of the three large concerns has a manufacturing department in which it produces a large share of the ready-made goods handled. Though about a quarter of the population of the country wear ready-made clothing, the imports under this heading are not large owing to the considerable domestic production. This industry has not been developed along the same lines as in the United States. There are no concerns that manufacture only and dispose of their products to the retail trade. In Chile the manufacturer is retailer also; or perhaps it would be more nearly correct to say that the retailer is also the manufacturer. The manufacturing department is usually only an appendage of the merchandising business and has been developed because of the high duties levied on imports of ready-to-wear garments. The models are usually imported and slight changes are made that the local designer suggests as needful to adapt the garment to the taste of the clientele. Many of the garments are made from paper patterns and features are adapted from illustrations to give them distinction. Both women's and men's clothing is made by these houses, as well as lingerie, collars, cuffs, shirts, and cravats.

Relatively few of the smaller merchants make any purchases direct, preferring to do business with the large importing houses with which they are well acquainted and which are frequently willing to give them longer credit than would be extended by foreign concerns. The large concerns, on the other hand, purchase the greater part of their stocks direct from the manufacturer or his representative, some of them maintaining offices in one or more of the foreign centers or having representatives who buy the goods, see that the shipments are made as promptly as may be, and give the local house all the information available as to new styles and types of goods or other useful points about the market or the general situation. Most of the larger importers also have well-established connections in the principal markets or buying agents that take care of their needs. Nevertheless much of the buying is done in the local house, and much more would be done locally if there were greater opportunity.

CUSTOMS CHARGES.[a]

The tariff of Chile is specific. Knitting yarns, weaving yarns, and thread for embroidery or marking are free of duty until December 31, 1920, but the manufactures of cotton aside from this item are dutiable. Customs dues are payable in gold, but the almost absolute lack of gold coin renders it necessary to pay in the depreciated paper currency at a rate fixed by the customs authorities each week, usually on the basis of the average rate for the previous week. The fluctuating value of the paper peso tends to encourage speculation, the rate changing at times very radically within a relatively short period. The duty is based on weight for nearly all articles, a few paying per unit or dozen, and there are several methods of ascertaining the weight on the different classes of articles, some paying on net weight, others on the weight including the immediate wrappings, others on the gross weight, and still others on the weight exclusive of boxes. In addition to the customs dues, several other charges must be paid; "movilización," for handling the goods, and if they are stored, "almacenaje." The storage charge on goods removed within four months is 4 per cent of the import duty.

WEIGHTS, MEASURES, AND CURRENCY.

Several years ago the metric system was officially adopted by the Government, but outside of the cities it was not used to any extent till within a very short time. To-day it is by no means universal, many of the country districts still clinging to the customary units. In all the larger cities and towns piece goods are sold by the meter and it is essential that invoices and all shipping documents should contain the metric equivalents, if the English system of measurements is stated. The approved length of pieces in this market is 40 yards, though some of the finer classes of white goods come in half-pieces of 20 yards each.

The rapid fluctuation of the paper peso deters exporters from quoting prices f. o. b. destination and the majority of purchases are made f. o. b. port of shipment. Quotations are sometimes made in "pesos oro" f. o. b. Valparaiso or other port convenient to the destination. The value of the peso oro (gold peso) is fixed by law at 18 pence (36.5 cents). Customs dues are payable in paper pesos at a rate varying from week to week but sufficiently high to cover the difference between the paper and gold values. At present (August, 1917) the Government refuses to recognize its own standard of value fixed on the gold peso and compels importers to pay a premium of 27 per cent over the fixed value, so that duties are abnormally high.

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[a] The text of the customs tariff of Chile, in English, has been issued by the Bureau of Foreign and Domestic Commerce as Tariff Series No. 36, which may be purchased for 15 cents from the Superintendent of Documents, Government Printing Office, Washington, D. C., or at any district or cooperative office of the Bureau.

One of the disadvantages from which Chile suffers is the lack of a stable currency. The monetary unit is the gold peso, but there is a lack of gold coins and the general business of the country is carried on by means of paper notes, which fluctuate in value from day to day. Five, ten, and twenty peso gold pieces are coined, but the total amount in existence is very small and it is unusual to see a gold coin in circulation. The following table shows the exchange value of the paper peso in English pence, the usual quotation, in January and July from 1900 to 1916, together with the average value for each year:

Years.	January.	July.	Annual average.	Years.	January.	July.	Annual average.
	Pence.	*Pence.*	*Pence.*		*Pence.*	*Pence.*	*Pence.*
1900	16.250	17.125	16.800	1909	12.875	10.562	10.781
1901	17.187	15.375	15.875	1910	10.687	10.968	10.781
1902	14.125	15.625	15.187	1911	10.937	10.625	10.625
1903	16.375	16.687	16.625	1912	10.343	10.093	10.125
1904	16.562	16.625	16.375	1913	10.094	9.562	9.750
1905	16.125	15.812	15.625	1914	8.968	9.500	8.968
1906	14.125	14.375	14.375	1915	7.500	8.000	8.250
1907	13.375	12.375	12.750	1916	8.529	9.253	9.460
1908	10.375	8.562	9.625				

On December 1, 1916, the peso was quoted at 11.604 pence, but since that time there has been a gradual rise in the value, with recessions at times, until on September 7, 1917, the rate is 14.5 pence. The influence of the enormous favorable trade balance can be seen in the increased value of the peso, and some are confident that it will reach very close to par before the end of the war, should peace not come within the next year.

The lack of stability in the currency naturally makes all business more or less speculative unless sales and expenses are covered by hedging with gold. Many of the stores make their prices in gold and most of the importers in selling to their clients quote on a gold basis, so that the purchaser stands the risk of fluctuations. The fluctuations in value are felt very severely by the employees of foreign houses, who are paid in the money of their own country; the advance in value of the peso has the effect of decreasing their salaries, because expenses remain practically the same in pesos, but the pound or dollar buys fewer pesos.

Several years ago the fact that an unstable currency is a hindrance to the economic development of the country led to the passage of a law that had for its object the equalization of the paper with the gold by the accumulation of a gold reserve abroad. An office of emission was authorized, which was to issue legal-tender notes at the rate of 1 peso for each 18 pence against the deposits of gold in specified banking centers, the equalization to take place on January 1, 1910; but conditions were so unfavorable that on August 30, 1909, Congress authorized the postponement of the reform until January 1, 1915, or such time before that date as the paper peso arrived at and maintained for six months a value in excess of 17.625 pence. The outbreak of the European war further postponed currency reform for Chile.

The amount of paper money in circulation in 1916 was 177,980,119 pesos, and the gold reserve accumulated for the purpose of placing the currency on a firm basis amounted to 87,759,702 pesos ($32,032,291), kept as follows: By the State, 3,643,634 pesos ($1,329,926); in England, 58,765,776 pesos ($21,449,508); in Germany, 22,225,687 pesos ($8,112,376); and in the United States, 3,124,605 pesos ($1,140,481). The external indebtedness of the country on December 31, 1916, amounted to 429,620,600 pesos, gold ($156,811,500), and the internal debt to 42,708,193 pesos, gold ($15,588,490). The credit of the country is high, as its obligations are met promptly and the amortization of the debt is progressing in conformity with the plans formulated.

APPENDIXES.

Appendix A.—SAMPLES.

The following samples were transmitted by Special Agent Tucker as typical of the textile materials most used in Chile. The samples may be seen at the New York office of the Bureau of Foreign and Domestic Commerce, Room 734, Customhouse. It should be especially noted that fluctuations in exchange make the prices in United States currency vary from day to day, even when the prices in pesos are unchanged.

Sample 1.—Gray drill; made in England; 29 inches wide, 96 by 64 construction, 3.50 yards per pound; invoice price, $0.146 per meter; retail price, $0.42 per meter (1.09 yards).

Sample 2.—"Crudo," gray sheeting; made in England; 31 inches wide, 68 by 64 construction, 2.72 yards per pound; invoice price, $0.16 per meter; retail price, $0.392 per meter.

Sample 3.—"Lienzo," white shirting; made in England; 30½ inches wide, 84 by 78 construction, 5.70 yards per pound; invoice price, $0.11 per meter; retail price, $0.31 per meter.

Sample 4.—Long cloth; made in England; 33 inches wide, 84 by 80 construction, 4.65 yards per pound; invoice price, $0.15 per meter; retail price, $0.392 per meter.

Sample 5.—Long cloth; made in England: 36 inches wide, 84 by 84 construction, 4.25 yards per pound; invoice price, $0.18 per meter: retail price, $0.462 per meter.

Sample 6.—Bleached drill; made in England; 27 inches wide, 130 by 84 construction, 3.15 yards per pound; invoice price, $0.208 per meter; retail price, $0.70 per meter.

Sample 7.—Bleached drill; made in England; 28 inches wide, 86 by 50 construction, 2.45 yards per pound; invoice price, $0.246 per meter: retail price, $0.84 per meter.

Sample 8.—Muslin; made in England; 32 inches wide, 96 by 96 construction, 10.50 yards per pound; invoice price, $0.182 per meter: retail price, $0.523 per meter.

Sample 9.—Wide sheeting; made in England; 64 inches wide, 76 by 76 construction, 1.95 yards per pound; invoice price, $0.48 per meter; retail price, $1.26 per meter.

Sample 10.—Linen sheeting; made in England; 88 inches wide, 74 by 72 construction, 1.20 yards per pound; invoice price, $1.78 per meter· retail price, $5.04 per meter.

Sample 11.—Cotton and linen sheeting; made in England; 85 inches wide, 74 by 68 construction, 1.15 yards per pound; invoice price, $0.94 per meter; retail price, $7 per meter.

Sample 12.—Table pad, "molleton grueso"; made in England; 62 inches wide, 18 by 18 construction, 1 yard per pound; invoice price, $0.65 per meter: retail price, $1.82 per meter.

Sample 13.—Bleached flannel; made in France; 32 inches wide, 72 by 120 construction, 3.50 yards per pound; invoice price, $0.40 per meter; retail price, $1.036 per meter.

Sample 14.—Twilled gray flannel; made in England; 32 inches wide, 80 by 48 construction, 1.95 yards per pound; invoice price, $0.3556 per meter; retail price, $0.70 per meter.

Sample 15.—Dyed flannel; made in England; 32 inches wide, 30 by 30 construction, 4.15 yards per pound; invoice price, $0.194 per meter; retail price, $0.56 per meter.

Sample 16.—Fancy woven flannel; made in Italy; 26 inches wide, 54 by 60 construction, 2.85 yards per pound; invoice price, $0.38 per meter; retail price, $0.98 per meter.

Sample 17.—Printed flannel; made in Italy; 27 inches wide, 50 by 34 construction, 3.45 yards per pound; invoice price, $0.21 per meter; retail price, $0.644 per meter.

Sample 18.—"Tulle" net; made in France; 36 inches wide; invoice price, $0.24 per meter; retail price, $1.12 per meter.

Sample 19.—Net; made in France; 36 inches wide· invoice price, $0.30 per meter; retail price, $1.40 per meter.

Sample 20.—Gingham; made in England; 38 inches wide, 78 by 72 construction, 4.95 yards per pound; invoice price, $0.28 per meter; retail price, $0.59 per meter.

Sample 21.—Bleached shirting; made in England; 31 inches wide, 96 by 84 construction, 4.50 yards per pound; invoice price, $0.236 per meter; retail price, $0.756 per meter.

Sample 22.—Striped shirting; made in England; 31 inches wide, 82 by 60 construction, 5.30 yards per pound; invoice price, $0.156 per meter; retail price, $0.446 per meter.

Sample 23.—Striped shirting; made in England; 32 inches wide, 94 by 76 construction, 6.25 yards per pound; invoice price, $0.212 per meter; retail price, $0.56 per meter.

Sample 24.—Ticking; made in England; 54 inches wide, 96 by 60 construction, 2 yards per pound; invoice price, $0.64 per meter; retail price, $1.68 per meter.

Sample 25.—"Brin"; made in England; 36 inches wide, 48 by 40 construction, 3.16 yards per pound; invoice price, $0.28 per meter; retail price, $0.63 per meter.

Sample 26.—Scrim; made in England; 36 inches wide, 22 by 22 construction, 10.6 yards per pound; invoice price, $0.056 per meter; retail price, $0.154 per meter.

Sample 27.—"Polonesa," lining; made in France; 38 inches wide, 140 by 48 construction, 6.30 yards per pound; invoice price, $0.45 per meter; retail price, $2.88 per meter.

Sample 28.—Damask; made in England; 62 inches wide, 60 by 48 construction; 1.63 yards per pound; invoice price, $0.78 per meter; retail price, $3 per meter.

Sample 29.—Damask; made in England; 64 inches wide, 70 by 62 construction, 2.02 yards per pound; invoice price, $0.78 per meter; retail price, $2.45 per meter.

Sample 30.—Damask; made in England; 62 inches wide, 104 by 48 construction, 1.56 yards per pound; invoice price, $0.716 per meter; retail price, $2 per meter.

Sample 31.—Wool bunting; made in England; 18½ inches wide, 34 by 34 construction, 3.15 ounces per yard; invoice price, $0.22 per meter; retail price, $0.90 per meter.

Sample 32.—Flannel; made in England; 30 inches wide, 1,440 ends and 48 picks, 4.92 ounces per yard; invoice price, $0.436 per yard; retail price, $2.15 per meter.

Sample 33.—Serge; made in France; 54 inches wide, 3,360 ends and 56 picks, 9.5 ounces per yard; invoice price, $1.60 per meter; retail price, $6.25 per meter.

Sample 34.—Broadcloth; made in France; 52 inches wide, 3,760 ends and 56 picks, 9.15 ounces per yard; invoice price, $1.78 per meter; retail price, $7 per meter.

Sample 35.—Gabardine; made in France; 52 inches wide, 4,960 ends and 62 picks, 10 ounces per yard; invoice price, $1.42 per meter; retail price, $5 per meter.

Sample 36.—Serge; made in France; 54 inches wide, 2,920 ends and 56 picks, 7.5 ounces per yard; invoice price, $0.73 per meter; retail price, $3 per meter.

Sample 37.—Tropical cassimere; made in Chile; 54 inches wide, 1,440 ends and 20 picks, 13 ounces per yard; cost, $2.75 per meter; retail price, $3.50 per meter.

Sample 38.—Cotton-back satin; made in France; 21 inches wide; invoice price, $0.52 per meter; retail price, $2.25 per meter.

Sample 39.—Satin; made in France; 21 inches wide; invoice price, $0.58 per meter; retail price, $2.25 per meter.

Sample 40.—Crêpe de chine, made in France; 40 inches wide; invoice price, $1.14 per meter; retail price, $5 per meter.

Sample 41.—Taffeta; made in France; 40 inches wide; invoice price, $1.30 per meter; retail price, $5.25 per meter.

Sample 42.—Pongee; made in Japan; 26 inches wide; invoice price, $0.55 per meter; retail price, $2 per meter.

MEN'S WEAR WOOLENS.

Sample 43.—Unfinished worsted; made in England; 56 inches wide, 18.5 ounces per yard; invoice price, $3.04 per meter; retail price, $5.62 per meter.

Sample 44.—Fancy cassimere; made in England; 18 ounces per yard; invoice price, $2.43 per meter; retail price, $4.60 per meter.

Sample 45.—Fancy cassimere; made in England; 15.5 ounces per yard; invoice price, $2.10 per meter; retail price, $4.52 per meter.

Sample 46.—Fancy worsted; made in England; 16.5 ounces per yard; invoice price, $2.79 per meter; retail price, $5.20 per meter.

Sample 47.—Unfinished worsted; made in England; 15 ounces per yard; invoice price, $3.52 per meter; retail price, $5 per meter.

Sample 48.—Unfinished worsted; made in England; 13 ounces per yard; invoice price, $2.55 per meter; retail price, $4.81 per meter.

Sample 49.—Serge; made in England; 16 ounces per yard; invoice price, $2.55 per meter; retail price, $4.81 per meter.

Sample 50.—Serge; made in England; 19.5 ounces per yard; invoice price, $2.79 per meter; retail price, $5.29 per meter.

Sample 51.—Unfinished piece-dyed worsted; made in England; 18 ounces per yard; invoice price, $3.27 per meter; retail price, $6.02 per meter.

Sample 52.—Unfinished worsted, piece-dyed; made in England; 17.5 ounces per yard; invoice price, $2.85 per meter; retail price, $5.29 per meter.

Sample 53.—Unfinished worsted, piece-dyed; made in England; 17 ounces per yard; invoice price, $3.04 per meter; retail price, $5.62 per meter.

Sample 54.—Serge; made in England; 20 ounces per yard; invoice price, $2.19 per yard; retail price, $4.27 per meter.

Sample 55.—Serge; made in England; 15 ounces per yard; invoice price, $2.43 per yard; retail price, $4.52 per meter.

Sample 56.—Fancy worsted; made in England; 15 ounces per yard; invoice price, $2.55 per yard; retail price, $4.81 per meter.

UNIFORM CLOTHS AND TRIMMINGS.

The uniform cloths, except those for officers' uniforms, are of Chilean manufacture, taking the place of fabrics formerly imported from England and Germany. The local mills are not equipped with steam finishing machinery and they can not produce the face-finished goods required for officers' uniforms. The scarcity of dyestuffs has forced the adoption of colors other than those formerly employed, the cloths in several instances representing fabric rather than the particular cloth generally used. These, as well as Samples 43 to 56, inclusive, are 56 inches wide. The consumption figures are for one of the four uniform manufacturers in the country, and the prices given are those paid by the manufacturers.

Sample 57.—Paño kaki, for rural mounted police, who use 4,000 meters annually; weight 750 grams per meter; price, $4.37 per meter.

Sample 58.—Sarga contrata ferrocarriles, for railway employees; 18 ounces per yard; price, $3 per meter; 5,000 meters annually.

Sample 59.—Paño contrata ferrocarriles, railway men's overcoating; 22 ounces per yard; price, $4 per meter; 5,000 meters annually.

Sample 60.—Paño gris para policia, police uniform; 29 ounces per yard; price, $4 per meter; 15,000 meters annually.

Sample 61.—Sarga gris para policia, police suiting; 18 ounces per yard; price, $2.75 per meter; 12,000 meters annually.

Sample 62.—Franela lacre, red flannel for stripings; 13.5 ounces per yard; price, $2.75 per meter; 300 meters annually.

Sample 63.—Sarga feldgrau, troopers' uniform; 18.5 ounces per yard; price, $2.75 per meter; 2,000 meters annually.

Sample 64.—Paño feldgrau, troopers' overcoating; 24 ounces per yard; price, $4 per meter; 6,000 meters annually.

Sample 65.—Borlon feldgrau, for riding breeches; 28 ounces per yard; price, $4.30 per meter; 2,000 meters annually.

Sample 66.—Paño jornal ferrocarriles, railway officials' uniform overcoat; 25 ounces per yard; price, $3.75 per meter; 3,000 meters annually.

Sample 67.—Sarga jornal ferrocarriles, railway officials' uniform; 18 ounces per yard; price, $2.80 per meter; 3,000 meters annually.

Sample 68.—Castilla; 33 ounces per yard; price, $4 per meter; 10,000 meters annually.

Sample 69.—Arpillera, burlap for interlining; 35 inches wide; price, $0.14 per meter; 25,000 meters annually.

Sample 70.—Lona fina, burlap interlining; 24 inches wide; price, $0.34 per meter; 5,000 meters annually.

Sample 71.—Choleta, cambric lining; 34 inches wide, 80 by 60 construction, 5.80 yards per pound; price, $0.50 per meter; 3,000 meters annually.

Sample 72.—Brin cabeza de perro, dogs' head drill; 27 inches wide, 64 by 54 construction, 3.05 yards per pound; price, $0.32 per meter; 80,000 meters annually.

Sample 73.—Loneta blanca, duck; 28 inches wide, 88 by 44 construction, 2.60 yards per pound; price, $0.476 per meter; 100,000 meters annually.

Sample 74.—Sarga forros, twilled lining; 54 inches wide, 76 by 104 construction, 2.60 yards per pound; price, $0.70 per meter; 20,000 meters annually.

Sample 75.—Alpaca; 48 inches wide, 44 by 44 construction, 2.70 yards per pound; price, $2.45 per meter; 200 meters annually.

Sample 76.—Percalina; 38 inches wide, 76 by 54 construction, 4.10 yards per pound; price, $0.505 per meter; 15,000 meters annually.

Sample 77.—Tocuyo liso, gray sheeting; 29 inches wide, 56 by 54 construction, 3.50 yards per pound; price, $0.21 per meter; 15,000 meters annually.

Sample 78.—Drill; made in England; 29 inches wide, 56 by 54 construction, 3.40 yards per pound; invoice price, $0.22 per meter; 100,000 meters annually.

CLOTHS FOR OFFICERS' UNIFORMS.

Sample 79.—Dress coating; made in Germany; 16 ounces per yard; cost $3 per yard.

Sample 80.—Worsted; made in England; 13.5 ounces per yard; cost $2.75 per yard.

Sample 81.—For capes; made in England; 15 ounces per yard; cost $3 per yard.

Sample 82.—Infantry uniform; made in England; 19 ounces per yard; cost $3.25 per yard.

Sample 83.—Melton; made in England; 18 ounces per yard; cost $3.15 per yard.

Sample 84.—Melton; made in England; 19 ounces per yard; cost $3.50 per yard.

Sample 85.—Diagonal; made in England; 18 ounces per yard; cost $3.10 per yard.

Sample 86.—Overcoating; made in England; 20 ounces per yard; cost $3.50 per yard.

Sample 87.—Diagonal overcoating; made in England; 22 ounces per yard; cost $3.40 per yard.

Sample 89.—Venetian; made in England; 19.5 ounces per yard; cost $3.35 per yard.

Sample 90.—Venetian; made in England; 18 ounces per yard; cost $3.15 per yard.

Sample 91.—Melton; made in England; 23 ounces per yard; cost $3.75 per yard.

Sample 92.—Worsted diagonal; made in England; 22.5 ounces per yard; cost $4 per yard.

Sample 93.—Melton; made in England; 19 ounces per yard; cost $3.45 per yard.

Sample 94.—Lining; made in England; 5.5 ounces per yard; cost $1.24 per yard.

Sample 95.—Lining; made in England; 6 ounces per yard; cost $1.30 per yard.

Sample 96.—Lining; made in England; 6 ounces per yard; cost $1.22 per yard.

Sample 97.—Lining; made in England; 5.5 ounces per yard; cost $1.45 per yard.

Sample 98.—Lining; made in England; 8 ounces per yard; cost $1.65 per yard.

PASSEMENTERIE.

Sample 99.—Braid; made in France; cost $0.08; selling price $0.30.

Sample 100.—Braid; made in Germany; cost $0.04; selling price $0.12.

Sample 101.—Braid; made in Germany; cost $0.06; selling price $0.192.

Sample 102.—Edging; made in Germany; cost $0.0375; selling price $0.08.

Sample 103.—Edging; made in Switzerland; cost $0.06; selling price $0.10.

Sample 104.—Insertion; made in Switzerland; cost $0.02125; selling price $0.075.

Sample 105.—Lace edging; made in Germany; cost $0.32; selling price $0.48.

Sample 106.—Lace edging; made in Germany; cost $0.38; selling price $1.08.

Sample 107.—Fabric gloves; made in Germany; cost $3.80 per dozen; selling price $1.08 per pair.

Appendix B.—TRADE LIST.

A list of textile dealers in Chile, submitted in connection with this report, may be obtained from the Bureau of Foreign and Domestic Commerce or its district or cooperative offices. Inquirers should refer to file No. 1344.

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DEPARTMENT OF COMMERCE
BUREAU OF FOREIGN AND DOMESTIC COMMERCE
B. S. CUTLER, Chief

SPECIAL AGENTS SERIES—No. 165

TANNING MATERIALS OF LATIN AMERICA

BY

THOMAS H. NORTON
Commercial Agent

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LETTER OF SUBMITTAL.

Department of Commerce,
Bureau of Foreign and Domestic Commerce,
Washington, February 27, 1918.

Sir: Submitted herewith is a monograph on tanning materials in Latin America, prepared by Dr. Thomas H. Norton while he was a commercial agent of this bureau. The paper was submitted to the Second Pan American Scientific Congress, and was published in Volume VIII of the proceedings of the congress. As the edition of the proceedings is limited and its distribution confined mainly to libraries and Government offices, it has been deemed advisable to issue the paper in separate form, to make it more readily available to tanners and others interested in the leather industry.

The monograph presents a comprehensive survey of the tannin-bearing plants and trees in South and Central America and Mexico, and reveals the resources of these countries, thus far only slightly exploited, for meeting the increasing demands for tanning materials. Statistics of the Argentine quebracho industry have been brought down to the latest possible date.

Respectfully,
B. S. Cutler,
Chief of Bureau.

To Hon. William C. Redfield,
Secretary of Commerce.

TANNING MATERIALS OF LATIN AMERICA.

INTRODUCTION.

Throughout the more densely populated regions of the earth the available supply of vegetable material for use in tanning is steadily diminishing.

The importance of a more perfect and exact knowledge of the varied substances which contain tannin is now generally recognized.

In not a few tropical and subtropical lands a more or less complete "census" of the trees and shrubs belonging to this category is now being taken.

Few parts of our globe possess such a variety of tannin-bearing plants and trees as those included under the designation "Latin America."

It is the purpose of this study to enumerate and describe as completely as possible the known occurrence of such sources of tannin in the countries in question and to show the extent to which they are already utilized or are easily susceptible of exploitation.

It is highly probable that in many cases the real economic value of these American tannin yielders has not been fully appreciated. I was led to this conclusion by the appearance during 1913 in a prominent organ of the leather industry of the following list:

GEOGRAPHICAL DISTRIBUTION OF THE IMPORTANT TANNIN PLANTS.

India	68	Chile	3
Europe	40	Brazil	3
Australia	22	Argentina	3
Canada and the United States	16	New Zealand	3
Africa	9	Peru	2
Central America	7	Guiana	2
China	3	Asia	2
Japan	3	Mexico	1

It will be noticed at once from the above list with what painstaking care the sources of tannin in the British Colonial Empire have been studied.

CLASSIFICATION OF TANNING MATERIALS.

Tanning materials, in the broadest meaning of the term, include all substances capable of changing the skins of animals into leather. By this change the skin ceases to be liable to decay under ordinary conditions, becomes more or less soft and pliable, and is, as a rule, impermeable to water.

The materials used to accomplish these chemical and physical alterations in the nature of hides and skins are found in all three kingdoms of nature. They are likewise found among the products of chemical industry.

The mineral kingdom, for example, furnishes salt and alum, used for producing tawed or white leather.

In many countries animal fats, and notably in the Americas the brains of deers, have been employed to make chamois or wash leather.

Among chemical products such inorganic compounds as the salts of copper, iron, cerium, titanium, and notably of chromium, and organic aldehydes, especially formaldehyde, have all been used for tanning.

The most important tanning materials are those derived from the vegetable kingdom. They include a great variety of woods, barks, leaves, fruits, etc., containing in varying amounts the so-called tannins or tannic acids. These latter differ widely in chemical constitution and properties. They all possess in common the power of precipitating gelatin from its solution as an insoluble compound. They are also all derivatives of the aromatic series, containing either pyrocatechol, $C_6H_4(OH)_2$, pyrogallol, $C_6H_3(OH)_3$, or, somewhat rarely, phloroglucinol, the isomeride of the latter. The result of their action upon the hides of cattle is the production of the brownish, yellowish-brown, or reddish-brown leather of commerce.

This paper will describe such occurrences of the tannins in the flora of Latin America as are actually or potentially of importance among the world's sources of tanning materials.

It is manifestly impossible to include in any such list all tannin-yielding plants. A tabulation of that character would embrace a large part of the vegetable kingdom as represented in the indigenous growths of Latin America.

For the sake of convenience these substances may be classified under the following heads: Woods, barks, leaves, excrescences, roots and bulbs, fruits and seeds.

TANNINS FROM WOODS.

The number of woods yielding tannin in sufficient abundance to warrant an industrial exploitation is exceedingly limited throughout the world. The woods of the oak and the chestnut form almost the only examples in the Northern Hemisphere.

The past few decades have witnessed the rapid extension of the use in tanning of the quebracho wood of Argentina. It may now be regarded as the most important tannin asset of the world. Its dominating position is revealed in the import statistics of the United States. During the fiscal year ending June 30, 1914, the tanning materials brought into the United States were valued at $3,864,000. Quebracho wood and extract constituted 87 per cent of the total. Quebracho, in fact, formed 38 per cent of all the tanning material used in the United States.

It will thus be easily realized that, while the number of plants and trees in Latin America yielding notable amounts of tannin is limited, one of these plays the leading rôle in the world's leather industry.

QUEBRACHO.

The name "quebracho" is derived from the Portuguese "quebrar," break, and "hacha," ax. Its literal meaning is "ax breaker." Formerly the term was applied to every hardwood tree in South America that dulled the chopper's tools. It is now used commercially in connection with but three trees, the true quebracho, the white quebracho, and the red quebracho. The latter two are of no importance as sources of tannin. Much confusion has resulted from the indiscriminate use of the name for totally different varieties of wood.

The true quebracho, *Loxopterygium* or *Quebrachia lorentzii* Griseb., belongs to the family of the Awacardiaceæ, or cashew family, and to the genus *Quebrachia.*

It is found in Argentina, Bolivia, Brazil, Paraguay, and Uruguay. The more specific habitat is a district extending eastward some 500 miles from the Andes Mountains, and reaching northward from near the mouth of the Parana River for a distance of about 600 miles. The area of this district is, roughly, 300,000 square miles. The territory in which the tree is industrially exploited includes the northern portion of Argentina and the Province of Chaco in Paraguay.

At the present rate of consumption, it is estimated that the annual cut of quebracho is much less than the sum total of annual growth. The total available supply is estimated at 168,000,000 tons. Less than 1,000,000 tons are cut annually at present.

The quebracho is never found in pure stands. It is scattered through open forests containing, as a rule, a large variety of species. It is rare to encounter more than five quebracho trees per acre.

In consequence of this scattered occurrence, it is necessary to cut annually over about 500,000 acres of forest land in order to secure the quantity required to meet the demands of the world's markets. The value of the quebracho forest land is quite variable. In Argentina, when near a railroad, it commands $2 or more per acre. In Paraguay the average price is $1.50 per acre, although there are cases where the rate is as low as 15 to 25 cents per acre.

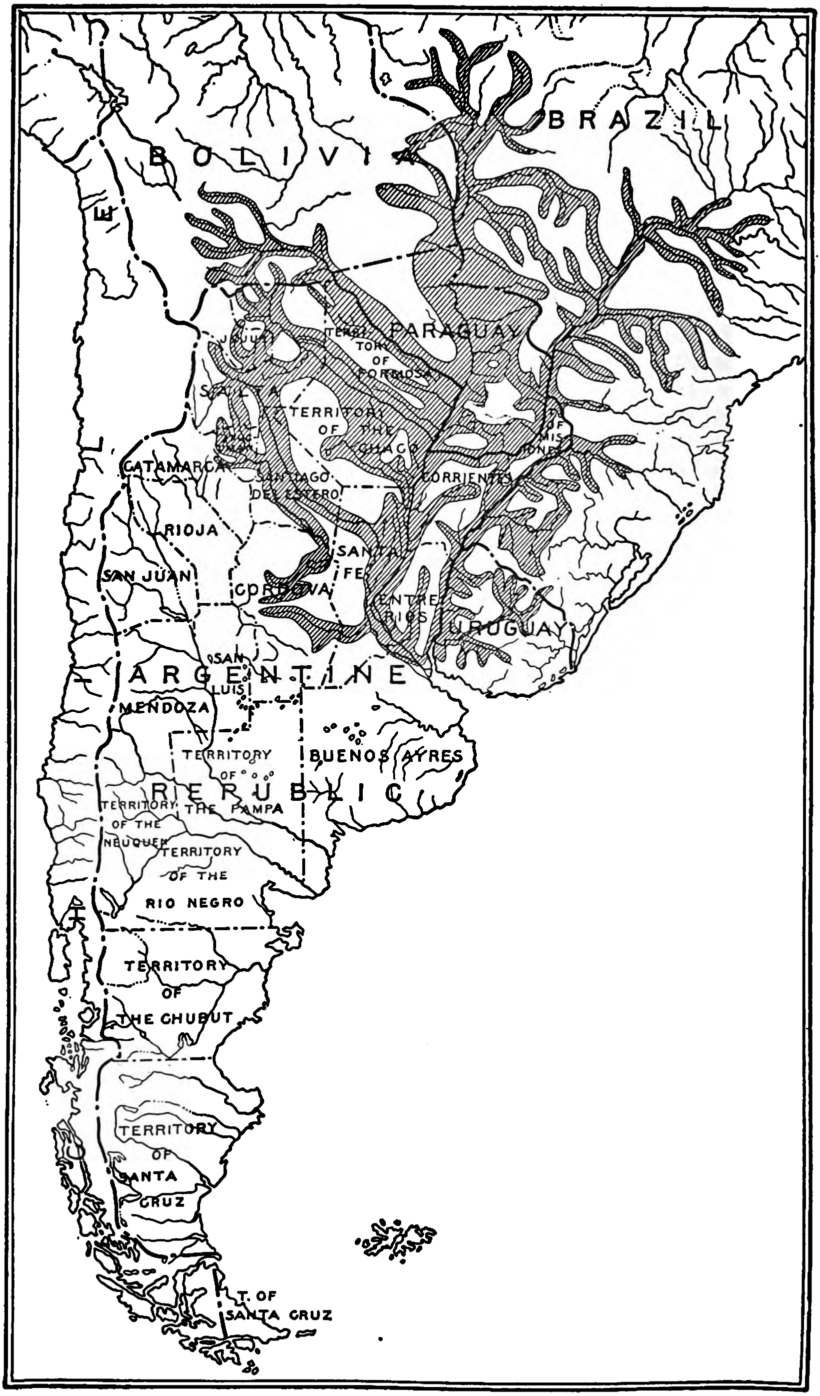
The favorable location for the quebracho tree is on slightly elevated ridges lying between watercourses. A sandy soil, with moderate atmosphere but abundant soil moisture, seems also conducive to growth.

Where conditions are very favorable, trees are encountered ranging in height from 50 to 75 feet and varying in diameter from 2 to 4 feet. Ordinarily the trees are 18 to 36 feet in height and 18 to 40 inches in diameter. The best wood is found in the virgin forests along the Parana River and the Picole Majo River.

Thus far, the tree seems to be immune against the attacks of insects.

When first felled, the sapwood is of a light yellow color. On exposure to the sun it assumes a light-red tint. The hardwood, when freshly cut, is of a dark, cherry-red color. This deepens with age.

Quebracho wood ranks among the heaviest and hardest woods known. It is the most durable wood found in Argentina. Highly tempered tools are needed to work it, even when in the green state. After complete seasoning it is exceedingly resistant to cutting tools. The specific gravity ranges from 1.27 to 1.38. Ordinarily, 1 cubic foot weighs 78 pounds.



Distribution of the quebracho tree (*Quebrachia lorentzii*).

As the quebracho wood is fine-grained and takes a beautiful polish, it possesses a pronounced commercial value and is employed locally for a great variety of uses—for cabinetmaking, house construction, etc. It does not appear, however, that for such purposes it ranks above other hardwoods occurring in Argentina.

Apart from its chief use as a source of tannin, it has been in abundant demand in Argentina for many years as a satisfactory material for railroad ties. Nine such ties weigh 1 ton. These ties remain on a roadbed indefinitely in a state of perfect preservation. It has been assumed that the large amount of tannin present acts as a preservative and causes the durability. Ties now in use for 25 years are absolutely sound.

Throughout the region of occurrence, the quebracho ties are gradually replacing the iron or steel ties hitherto used in railroad construction. The standard ties on the Argentina broad-gauge railway are 9 feet long, 10 by 13 inches cross section. They cost $2 to $2.50 each. On account of the hardness of the wood spikes can not be driven into it. Holes are therefore bored and bolts are employed to fasten the rails.

The chief drawback to the use of quebracho wood for this purpose is the almost total lack of resilience. There is also a marked tendency to crack when exposed to frost. The necessity of boring holes for the bolts used makes an additional expense.

Experiments have been started in the United States to test the desirability of quebracho ties for our railways. The quebracho timberland of Argentina yields, on an average, 18 ties per acre. American white oak or pine forests yield from 40 to 60 ties per acre.

TANNIN VALUE OF QUEBRACHO.

The tannin content of the different parts of the quebracho tree varies somewhat with the region where it grows. Numerous analyses give, ordinarily, the following results:

	Per cent of tannin.
Heartwood	20–24
Sapwood	3– 4
Bark	6– 8

One analysis from the Gran Chaco district shows an unusually high tannin content:

	Per cent.
Tannin	28.20
Foreign substances extracted	1.70
Extract ash	.40
Water	11.85
Insoluble matter	57.85

Jean (Bull. Soc. Chem., 1880, 33, 6) found that the tannin of quebracho was distinctly different from that of oak bark or chestnut wood. In 1903, Procter (Leather Manufacture, 269) showed that a red phlobophane was present in the tannin, and that it contained catechol and phloroglucinol nuclei.

In 1906, Strauss and Geschwender (Zeitschr. f. angew. Chem., 19, 1121) isolated the pure tannin, free from phlobophanes. It formed a light, flaky mass, easily becoming sticky when exposed to the air on account of its hygroscopic character. They consider it as identical with maletto tannin, found in the bark of various species of eucalyptus, notably *Eucalyptus occidentalis*, and with the tannin extracted from cinchona bark. It received the formula of $C_{43}\ H_{50}\ O_{20}$.

Nierenstein (Collegium, 1905, 65, and Ber. d. deut. ch. Gesell., 1907, 40, 4575) regards the quebracho tannin as consisting of a mixture of three distinct tannins. From quebracho phlobophane, on distillation with zinc dust, he obtained anthracene. Incidentally, this reaction is worthy of more extended study, as offering a source of hydrocarbon for use in the manufacture of alizarin.

It is definitely established that a considerable amount of the tannin extracted from quebracho is but sparingly soluble in cold water, and is partly deposited when hot aqueous solutions are allowed to cool.

There is still much to be done in clearing up the exact chemical nature of the tannin content of quebracho, and it is to be hoped that the problem may be solved in a final manner. It is highly probable that a more exhaustive study may pave the way for removing the difficulties attendant upon the use of quebracho extract alone for tanning purposes.

In this connection, it may be noted that quebracho wood contains a fine yellow dye, fisetin, identical with the dyestuff present in young fustic. It is present as a glucoside combined with tannic acid. The colors obtained from fisetin are, unfortunately, somewhat fugitive to light. Mention may also be made of the "quebracho resin," which collects as a thickened juice in crevices of the tree.

UTILIZATION OF QUEBRACHO FOR TANNING.

It is worthy of note that, as a rule, the sapwood of the quebracho tree and its bark are completely neglected as sources of tannin, and are allowed to go to waste. When we consider that chestnut wood contains but 3 to 6 per cent of tannin, that oak wood contains but 2 to 3 per cent, that the tannin content of oak bark is often as low as 8 per cent, and yet know that all three are profitably employed on a relatively large scale as sources of tanning extracts, it is a matter of surprise that these two constituent portions of quebracho logs should be entirely neglected, when once in the possession of extract factories.

There would appear, also, to be a distinct field for experimentation on the characteristics of the tannins formed in the sapwood and in the bark of the quebracho tree. It is not impossible that they may be free, to some extent, from certain disadvantages attending the use of the tannin obtained from the heartwood. Almost invariably, the tannin present in the heartwood is extracted by boiling with water, and the concentrated extract is used for tanning purposes.

The special field of usefulness for quebracho in the production of current forms of leather has now been quite clearly defined.

In regard to color, quebracho alone does not seem to impart any distinctive tint. However, when alum and salt are added to the bath, finer results are obtained than when gambier is employed. The resultant leather is of a handsome, pale, straw-colored grain on the exterior surface, while the flesh side remains almost white.

Quebracho adds weight and firmness to the tanned product. It yields a light leather well adapted to take on all varieties of dyes, and also heavy leathers of excellent quality.

Its chief advantages lie in its cheapness and in the ability to effect rapidly a thorough tanning, very marked in the case of certain forms of leather. It is particularly adapted to tan hide promptly and to facilitate the absorption of the very strong liquors employed in the final stages of tanning.

On account of the absence from quebracho extract of certain nontanning substances, occurring ordinarily in the extracts of most tannin-yielding plants and trees, it fails to produce, alone, the highest grade of leather. It is therefore ordinarily mixed with other tanning materials, such as the extract of mangrove, or chestnut or oak bark, all of which are rich in nontannins. When combined with oak bark especially, the results are most satisfactory, the cost of tanning is very notably decreased, and the leather obtained is equal, in every respect, to that made by the use of pure oak liquor.

MANUFACTURE OF QUEBRACHO EXTRACT.

The cost of cutting quebracho logs and conveying them to the extraction factories, or to points of shipment by rail or water, is usually much greater than the cost of preparing the extract. Ordinarily, after a tree is felled, the logs (16 to 32 feet in length) are freed from bark, sapwood, and branches, and hauled by ox team to the nearest factory or railway station or landing place on a river. This transportation of the logs is especially difficult and expensive in Paraguay, where there is no local market for the wood or the extract. As a rule, the Paraguay quebracho is largely shipped to Buenos Aires.

The best timber is frequently reserved for building purposes, for cabinetmaking, etc. The culls, or second-quality wood, are employed for extractive purposes.

The extraction industry is very effectively organized in Argentina, some of the companies being quite well financed. The recent consolidation of the Forestal Co. and the Santa Fe Land Co. has placed in the control of a single corporation a capital of $10,000,000 and an area of forest land exceeding 6,000,000 acres.

One large Argentine plant has a monthly output of 1,000 tons of extract; another produces monthly 600 tons. There are quite a number with a monthly output of from 200 to 300 tons. All are equipped with modern extractive apparatus, chiefly of German construction. Some of the companies were engaged, until recently, in supplying railroad ties. They have discovered that the same amount of wood, which yields ties worth $3.50, supplies extract worth from $10 to $12. In the larger factories, the daily consumption of water reaches several thousand cubic meters. Some factories are located in regions destitute of pure, fresh water for the purpose of extraction. As a result, all water required for such use must be purified by distillation.

On the upper Paraguay River there are five plants for making quebracho extract, and the machinery is nearly all of German origin. The capital invested is partly German, partly Argentine. During 1912, these factories all ceased operations. This action caused a financial panic, as the output of the five works brought into the country monthly over $100,000 of foreign money. Since the outbreak of the present war, the price of extract has practically quadrupled and three of the factories are again in active operation.

PROCESS OF EXTRACTION.

In most of the extractive factories of Argentina and Paraguay, the quebracho logs are first reduced to chips and shavings, by machines similar to those used for dyewoods. It is stated that, in some cases, the logs are split into boards, and that the spent boards are used later for fence posts, beams, paving blocks, railway ties, etc. The sole use for spent material in American works is as fuel.

The most approved device for chipping the quebracho consists of revolving cylinders faced with strong knives. As the logs are pressed against these cylinders, the wood is sliced transversely to the grain, into chips about one-eighth of an inch in length.

Formerly, extraction took place in open wooden vats, similar to those customarily employed for the extraction of sumac. The resultant liquor, obtained by diffusion, was better colored, as there was no decomposition of tannin, in consequence of the use of heat. The leaching was, however, very imperfect. Now, closed extractors of copper are in general use. Some of these extractors have a capacity of 15 cubic meters (530 cubic feet). Steam is admitted directly. The operation is rapid, and very concentrated liquors are obtained in place of the dilute solutions secured by diffusion batteries. These concentrated liquors show a strength of 20° B. upward.

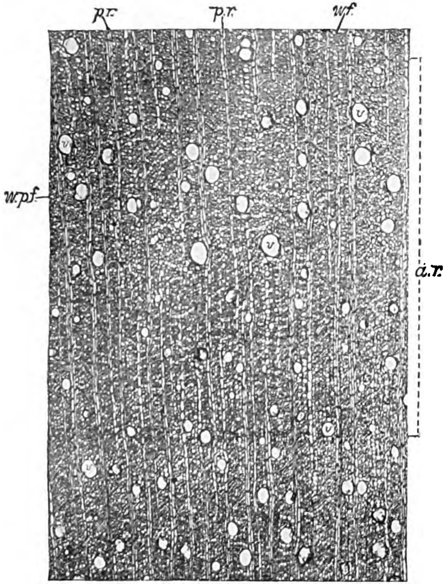
As a rule, they are cooled by circulation through a system of pipes, and are clarified by being allowed to stand for some time at a temperature of 15° C. until most of the insoluble sediment has been deposited. During this operation, light and air are excluded in order to prevent oxidation and a resultant darkening of the liquor.

For a more complete chemical clarification and decolorization, various substances are in current use, such as animal blood, lead nitrate, alum, sulphurous acid, sulphides, and resin soap. The use of a resin soap solution, with finely powdered lead sulphate or barium sulphate, seems to give fair results. Better results, however, are ordinarily obtained by the Tagliani, or alkaline sulphite, method. Until this process was introduced, the use of quebracho extract was frequently attended by the formation on hides of a slimy precipitate, which very materially delayed the operation of tanning. An adequate treatment with sodium sulphite effectually removes the matters which give rise to this precipitate. All the above reagents cause the liquor to assume a much lighter tint.

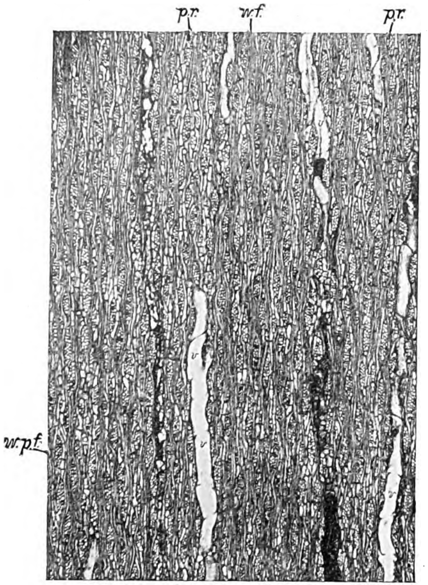
After clarification and decolorization, the quebracho extract is evaporated in vacuum pans to a sirupy consistency. These liquid extracts contain from 50 to 60 per cent of water and have a density of from 20° to 30° B. The Yaryan evaporator is largely used for concentration to 20° B.

Sometimes the evaporation is carried so far that but 20 to 25 per cent of water remains. The resultant extract, on cooling, is solid.

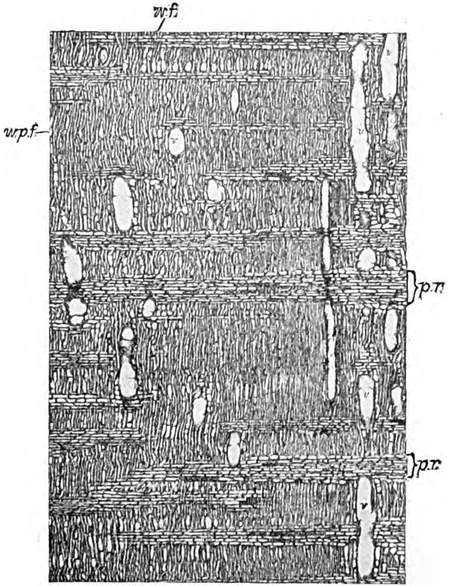
It is to be noted, in connection with the general process of extraction, that from 91 to 93 per cent of the tannin present in quebracho wood is extracted, and that but a small amount of nontannins enter into solution. In the Argentine factories, but little attempt is made to carry the extraction beyond the point at which about 3 per cent of tannin remains in the spent wood.



Pl. II, Fig. 1.—Transverse section of the wood of white quebracho (*Aspidosperma quebracho blanco*), showing parts of two annual rings of growth; *v.*, vessels; *w. f.*, wood fibers; *w. p. f.*, wood-parenchyma fibers; *p. r.*, pith rays. Magnified 25 diameters.



Pl. II, Fig. 2.—Tangential section of wood of white quebracho (*Aspidosperma quebracho blanco*); *v.*, vessels; *w. f.*, wood fibers; *w. p. f.*, wood-parenchyma fibers; *p. r.*, pith rays. Magnified 25 diameters.



Pl. II, Fig. 3.—Radial section of the wood of white quebracho (*Aspidosperma quebracho blanco*); *v.*, vessels; *w. f.*, wood fibers; *w. p. f.*, wood-parenchyma fibers; *p. r.*, pith rays. Magnified 25 diameters.

In the commercial extracts and pastes, it is found that there is a considerable amount of tannin present which is not soluble in strong tanning liquors. This is an exception to the ordinary rule. In all other tannin extracts, the entire quantity of tannin present is soluble in the strong liquors.

A typical sample of quebracho extract, on analysis, showed:

	Per cent.
Tannin, soluble	64.5
Tannin, insoluble	8.0
Nontannins	7.5

A set of comparative analyses of a liquid extract and of a paste gave the following results:

Constituents.	Extract.	Paste.
	Per cent.	*Per cent.*
Water	43.6	18.7
Tannin	48.3	70.4
Nontannins	3.8	7.9
Ash	1.6	1.5
Insoluble	2.6	1.6
Carbohydrates	1.5	1.8
Parts of carbohydrates present to 100 parts tannin	3.1	2.6

The growth of the quebracho industry has been relatively rapid. The wood was first seen in Europe at the Paris Exposition of 1867. By 1871 several firms in Havre and Antwerp were using it regularly. In 1876 it was supplied to tanners in Switzerland and Alsace, and along the Rhine. At about the same time the use in Argentine tanneries assumed notable proportions.

The importation of quebracho wood into Europe began on a large scale in 1888. Germany became at once the leading consumer, using the new material largely in the production of sole leather. It was partly due to this factor that German sole leather began at that date to supplant the American article. In 1876 the United States exported sole leather to Germany to the extent of 6,400,000 pounds. In 1886, the export had sunk to 2,000,000 pounds. In 1906 the export was 205,000 pounds.

The growth of the Argentine export of quebracho wood and extract is shown in the following table:

VALUE OF EXPORTS OF ARGENTINE QUEBRACHO.

[Values are given in Argentine pesos: 1 peso equals $0.965 U. S. currency.]

Years.	Extract.	Logs.	Years.	Extract.	Logs.
1880		$10,121	1902	$909,904	$2,477,233
1881		11,016	1903	1,204,049	2,002,010
1887		5,095	1904	2,011,130	2,527,227
1888		172,700	1905	2,427,772	4,275,164
1889		485,357	1906	2,162,949	3,425,101
1890		826,508	1907	1,811,878	3,132,493
1891		1,245,628	1908	2,994,922	2,962,184
1892		617,811	1909	4,226,333	4,380,033
1893		1,265,942	1910	4,429,357	5,604,430
1894		962,687	1911	4,980,027	6,897,435
1895	$40,167	1,778,814	1912	4,836,860	3,568,557
1896	68,419	832,718	1913	4,974,686	4,988,349
1897	120,474	1,356,744	1914	5,186,946	9,238,745
1898	119,224	1,882,604	1915	15,873,372	2,684,408
1899	317,156	1,593,761	1916	19,663,098	2,321,747
1900	595,701	2,398,362	1917	9,966,958	1,582,554
1901	431,004	1,989,195			

In 1908 the total export of quebracho products from Argentina was 254,571 metric tons. The chief countries participating were:

	Metric tons.
United Kingdom	205, 065
United States	11, 949
Germany	8, 323
Italy	7, 282

In 1913 the total export of quebracho logs and extract reached 463,648 metric tons. The chief countries participating were:

	Metric tons.
United Kingdom	83, 035
United States	37, 835
Italy	30, 144
Germany	27, 212
Belgium	8, 695
Austria-Hungary	6, 519
France	3, 891

In 1913 the value of quebracho products shipped from Argentina constituted 2 per cent of the total exports, and stood ninth in importance in the list of exported articles. The chief Argentina shipping port at that time was Colastine, on the Parana River.

In 1916 the value of the quebracho products shipped from Argentina constituted 40 per cent of the total exports, and stood third in importance in the list of exported products. The chief shipping ports for quebracho in 1915 were Barranqueras (on the Parana River in the Territory of Chaco) and Buenos Aires.

The relations of the American market to the Argentine exports are shown in the following table:

IMPORTS OF QUEBRACHO WOOD AND EXTRACT INTO THE UNITED STATES, 1907 TO 1917.

Fiscal year.	Quebracho wood.		Quebracho extract.	
	Tons, long.	Value.	Pounds.	Value.
1907	66, 810	$840, 779	76, 034, 000	$2, 320, 000
1908	48, 871	612, 971	79, 187, 000	2, 260, 000
1909	66, 113	731, 795	102, 005, 000	2, 741, 000
1910	80, 210	1, 058, 647	87, 531, 000	2, 796, 000
1911	66, 617	984, 841	85, 721, 000	2, 894, 000
1912	68, 174	982, 315	67, 281, 000	2, 223, 000
1913	102, 766	1, 299, 995	74, 545, 000	1, 903, 000
1914	73, 911	899, 603	88, 589, 000	2, 441, 000
1915	54, 955	753, 981	120, 450, 283	3, 676, 749
1916	106, 864	1, 598, 465	81, 501, 952	5, 432, 468
1917	73, 367	1, 274, 660	59, 808, 734	5, 198, 904

The imports of South American quebracho wood and extract into Germany during the calendar years 1912 and 1913 were as follows:

	1912.	1913.
Quebracho wood, metric tons	106, 451	117, 081
Quebracho extract, metric tons	12, 158	17, 277

Exports of quebracho from Argentina to Germany in 1914, according to Argentine statistics, were: Wood, 10,875 tons; extract, 4,054 tons.

The British imports of quebracho extract from Argentina averaged annually in value $163,000 during the five years 1909–1913.

In connection with the importation of quebracho into the United States, it is to be noted that no duty has ever been imposed upon the logs. Prior to October 3, 1913, there was a duty of one-half cent per pound on the extract when below 28° B., and three-fourths cent when in excess of that degree of concentration. Since the date above mentioned, quebracho extract has entered the United States duty free.

The price in 1912 of quebracho logs at Montevideo and at Buenos Aires, f. o. b., ranged from $14 to $20 per long ton. The extract was then quoted at $80 to $85 per long ton.

In 1914 the logs destined for export to the United States cost on an average $12.17 per long ton at the port of shipment. The average cost of the extract at the same points was $61.04.

In the fiscal year ending June 30, 1915, the average price of logs was $13.72 per ton, and of extract, $68.50. In September, 1915, the average price of the latter had reached $115 per ton, and the price of the logs was $14.98.

OTHER ARGENTINE WOODS SIMILAR TO TRUE QUEBRACHO.

There are several other varieties of forest trees in Argentina and the neighboring territories containing limited amounts of tannins which probably would be utilized as sources of tanning material were it not for the abundance of the true quebracho, with its exceptionally high tannin content. Allusion has already been made to two of these, bearing also the popular designation of "quebracho."

The white quebracho, "quebracho blanco," *Aspidosperma quebracho blanco* (Schlecht), belongs to the family of the Apocynaceæ, which includes common dogbane, or Indian hemp. It is very common wherever the true quebracho occurs. It is found most abundantly in the moister regions of northern Argentina. It is an evergreen tree, conspicuous for its erect stem and wide-spreading crown. The height frequently ranges from 60 to 100 feet, and the diameter ranges from 1 to 3 feet. It is easily distinguished from the true quebracho, as the branches occur nearer the ground, and the foilage is much less compact. The wood is strong, hard, and very heavy. The specific gravity varies from 0.88 to 1.1. It is very close grained. The color is yellowish white, with a noticeable pinkish or rosy tint. Although not very durable in contact with soil, it is extensively employed for a variety of forms of woodwork. The dense, compact structure renders it an excellent substitute for boxwood in wood engraving. There is a marked tendency to warp and twist, unless care is taken in the seasoning. Unlike true quebracho, it is subject to insect attack. The wood contains about 3 per cent of a tannin, which is essentially the same as that found in the true quebracho. The leaves, on the contrary, possess on an average 27.5 per cent of a tannin, which is almost colorless and is insoluble. The bark contains 4 per cent of tannin. It is used locally as a febrifuge.

The red quebracho, "quebracho colorado," *Aspidosperma quebracho colorado* (Schlecht), belongs to the same family as the white variety, and occurs in abundance wherever the true quebracho is found. The wood, when freshly cut, possesses a bright red color, which changes to a dark brown with age. It is used for the same purposes as the white variety. Although it is more durable in contact with the soil, its commercial value is less than that of the allied variety. Its tannin content is also quite low.

Other members of the same family share with the above-mentioned varieties the property of hardness, and resemble them in appearance. They are: *Aspidospermum churneum*, with 7 per cent of tannin; *Aspidosperma peroba*, with 5 per cent; and *Aspidosperma sessiflora*, with 4 per cent. The wood of the latter contains a pink coloring matter of possible usefulness. It is a tall, stout tree, at present neither well known nor much used. It is found chiefly in Paraguay, in a few localities, north of latitude 26°.

Schinopsis balansæ (Engl.), of Paraguay, is reported also to have a fair amount of tannin, and to be used locally.

A member of the sandalwood family, *Iodina rhombifolia* (H. and A.), known as "quebracho flojo" or "sombra de toro," is a handsome evergreen tree, found occasionally in Argentina. Not only the wood, but also the bark, contains fair amounts of tannin.

Machaerium fertile (*Tipuana speciosa*), known as "tipa," contains much the same amount of tannin in both wood and bark.

The wood of *Cedrela tubiflora*, and other varieties of *Cedrela*, occurring in Paraguay, contains sufficient tannin to render it available for tanning purposes. They are members of a comparatively small genus in tropical South America, belonging to the bead-tree family (*Meliaceæ*). The trees grow to a large size, and the wood resembles mahogany in appearance.

The wood of young fustic, *Rhus cotinus* (Linn.), which occurs frequently in the West Indian Islands, contains a considerable amount of tannic acid in combination with the glucoside of fisetin, the handsome but somewhat fugitive yellow coloring matter of this tree. No attempt commercially seems to have been made to utilize this source. It is worthy of note that cases are very frequent where tannins are accompanied by yellow coloring matters. Young fustic is cultivated to some extent in Italy, where the leaves are encountered in commerce under the designation of Venetian sumac. They are frequently used for tanning purposes throughout southern Europe.

The well-known logwood, *Hæmatoxylon campechianum* (Linn.), occurring in such abundance in Yucatan, Honduras, San Domingo, and Jamaica, is a similar example of the combination of a dyestuff with tannin. The value of the coloring principle is such that hitherto there has been no attempt made to secure a tannin extract from the wood of this tree.

TANNINS FROM BARKS.

There is a much larger variety of tanning material available in the barks of different trees of Latin America than is the case with the woods. The amount of tannin extracted from quebracho wood alone is, however, much greater than the total obtained at present from all forms of bark, leaves, and roots. Many of these varieties of bark have an extensive local use in the different countries, especially in regions where the quebracho does not occur. Thus far they have not become of marked importance in international trade.

MANGROVE BARK.

The only possible exception to the above statement is found in the case of mangrove bark. The export of the bark from Venezuela, and of the extract of the bark from Colombia, have recently become a factor of growing interest in connection with the world's supply of tanning materials.

Hitherto the chief sources of mangrove bark have been Portuguese East Africa, Madagascar, and the East Indies (Celebes, Borneo, etc.). The bark of the mangrove growing naturally in these regions is regarded as distinctly richer in tannin than that found in South America, the content ranging from 38 to 48 per cent.

The mangrove bark of South America comes chiefly from *Rhizophora mangle* (Linn.). Other varieties of *Rhizophora*, as well as of *Ceriops*, *Avicennia nitida* (black mangrove, or "courouda"), *Avicennia tomentosa* (white mangrove), *Laguncularia*, *Conocarpus*, and *Cassipourea*, have a certain importance in this connection.

The mangrove jungles of tropical America fringe the tidal estuaries, overrun soft marshes, and line low, muddy coasts. The trunks and branches emit in abundance adventitious roots which, descending in curves, reach the soil at some distance from the parent stem and give rise to new trunks. The method of expansion closely resembles that of a banyan grove. Another remarkable arrangement of nature for the propagation of the tree is connected with the germination of the seeds. While the fruit is still hanging to the boughs, long radicles emerge from the seeds and descend rapidly to the mud beneath. Here, the plumule soon makes its appearance and a new growth is established. Some of the fruits and seeds of mangrove trees are provided with special devices, which enable them to float easily, and to be transported to quite a distance. A novel characteristic is found in the "pneumatophores," or air roots. These are branches of the root proper which project from the mud. They are provided with minute openings, so-called stomata or lenticels, through which air enters, and penetrates, by means of passages in the soft spongy tissue, to the roots spread beneath the surface of the mud.

The wood of some species is hard and durable. The fruit of the *Rhizophora* is sweet and wholesome, and serves to produce a light wine. It has a ruddy brown shell and a delicate white pulp.

The percentage of tannin in the bark of mangrove trees is quite variable, ranging from 5 to 45 per cent. The proportion increases with the age of the tree. The bark encountered in commerce, or used for extraction in the country of origin, contains usually from 22 to 33 per cent.

The tannin present can be isolated in the form of an amorphous, dark-red powder, which so closely resembles in its properties catechutannic acid that a possible identity is suspected. In practice, mangrove extract can be substituted with ease for catechu. A reddish-brown coloring matter accompanies this tannin, and imparts to leather a color quite similar to that resulting from the use of hemlock bark.

It is worthy of note that the leaves of mangrove trees are also fairly rich in tannin. They are largely used in the tanneries of southern Brazil. On account of the rapid deterioration in properties during transportation, they are rarely exported. In the tanneries of Santa Catharina, mangrove leaves are the sole material used. The annual consumption is about 400 metric tons. In the two tanneries of Santos there was in 1902 an annual consumption of 1,800 cubic meters of mangrove bark, and of 1,350 metric tons of the leaves. The same year, 1,000 metric tons of bark and 130 tons of the leaves were exported from the port of Santos.

The bark is encountered in commerce in the form of fragments of variable size. It is very hard and very heavy. The cortical cellular tissue has a pronounced reddish-brown tint. For local purposes, the bark or the leaves are used directly by tanneries, and not submitted to extraction. There is now a growing export of mangrove bark, especially from Venezuela. The extraction of the tannin, for convenience and economy in transportation, has not yet been as thoroughly perfected as in the case of quebracho. There are, however, in Colombia, a few well-organized factories for this purpose. One factory at Cartagena, and another at Sinu, 80 miles from the coast, are each capable of producing annually 3,000 metric tons of the solid extract.

The process of manufacturing mangrove extract does not differ materially from that employed in producing quebracho extract. The bark from the younger stems of the tree surrenders its tannin most easily. Care must be taken to avoid the presence of salt, apt to be found on the bark, and originating in the salty marshes where the tree grows. The liquors, before concentration, are frequently decolorized, or submitted to the bisulphite process, for the removal of undesirable substances. The solid product obtained by evaporation, in the Colombia factories, contains about 48 per cent of tannin. It has a vitreous luster and is very brittle. Extracts from mangrove bark of African origin contain from 60 to 70 per cent of tannin.

In tanning operations it is found that mangrove bark, or the extract, alone gives an objectionable color to leather. They are, therefore, blended ordinarily with other materials, such as myrobalans. In France, a favorite mixture is:

	Per cent.
Mangrove bark	30
Hemlock bark	40
Oak bark	20
Mimosa bark	10

This yields an excellent grade of leather, with a fine color.

On account of the limited amount of soluble nontannins in mangrove bark, the baths need to be but very slightly acidulated. The value of mangrove bark as a tanning agent for leather, and also as possessed of tinctorial properties, appears to have been recognized centuries ago in both hemispheres. Its use for coloring basket work was established far in the past. The first documentary evidence as to the employment of mangrove bark for the above purposes dates back to the early part of the sixteenth century, in San Domingo.

The use of the bark in Europe began in 1804, when British tanners included it among their recognized sources of tannin.

To-day it is regarded as one of the very cheapest forms of tannin now available, and its use is widespread. There seems to be every reason to expect that in the early future the enormous jungles of mangrove in Brazil, Venezuela, and Colombia will become most valuable assets.

The importation into the United States of tanning extracts from Colombia, during the fiscal year ending June 30, 1914, amounted to

931,567 pounds, valued at $25,494, or 2.73 cents per pound. Presumably these figures applied exclusively to the extract of mangrove bark.

There has been a small import into the United States of mangrove bark from both Colombia and Venezuela. In the fiscal year 1914 Colombia furnished 8 long tons, valued at $80, or $10 per ton; Venezuela supplied 87 tons, valued at $1,184, or $13.61 per ton. The import from Colombia reached 74 tons in 1912; and from Venezuela, 818 tons in 1910. The total import of mangrove bark into the United States, in 1914, was 7,689 long tons. In the fiscal year ending June 30, 1915, it was 13,040 tons. It attained 21,779 tons in 1912. Nearly all comes from the regions bordering the Indian Ocean.

MINOR BARKS.

There are a large number of other barks occurring in Latin America containing varying quantities of tannin, enough to render them at least of local value for the purpose of manufacturing leather. They may most conveniently be treated by grouping them under the countries where each one occurs most abundantly.

BARKS OF PARAGUAY.

A very complete exhibit of the barks occurring in Paraguay available for the tanner's use was made at the International Agricultural Exposition, held in 1910 at Buenos Aires. The catalogue of this special exhibit was very full and furnished data of value on each variety exhibited. A well-classified study of this exhibit was published by Dr. W. W. Stockberger in the Journal of the American Leather Chemists' Association, 1912, Volume VII, page 185.

The following is a résumé of the details given in the above sources, adopting Dr. Stockberger's systematic classification. The native names follow the botanical designation, in parentheses:

FAMILY ANONACEÆ.

Rollinia sp. (aratikú gwazú). Tannin content, 4.2 per cent. The tree, well known for its fruit, is very common in the forests, and frequently grows quite tall. The thin bark, abounding in bast fibers, is easily removed.

FAMILY APOCYNACEÆ.

Aspidosperma polyneuron Muell. (palo rosa). Tannin content, 2.6 per cent. A tall, stout tree yielding excellent timber. It is neither well known nor much used. It is of scattered occurrence in Parana, north of latitude 26°. A pink coloring matter in the wood deserves further investigation. The wood contains also a fair amount of tannin, and mention has been made of it in the preceding section.

Aspidosperma quebracho blanco Schlecht (white quebracho). Tannin content, 4 per cent. This tree has also been mentioned in the preceding section. It is quite abundant in Argentina. The leaves contain 27 per cent of tannin and the wood 3 per cent.

FAMILY BIGNONIACEÆ.

Tecoma ipê araliacea (?) (lapacho). Tannin content, 5 per cent. The tree is common and well known and one of those frequently used for timber. The bark is easily removed and has a whitish fracture. The epidermis and corky portion are cracked or fissured, and bast fibers are abundant.

FAMILY CÆSALPINIACEÆ.

Apuleia praecox Mart. (yhvihrá-perè). Tannin content, 10.7 per cent. The tree is stout, fairly common, and used for lumber. The pale yellow bark is smooth and not easily removed.

Copaifera lansdorfii Desf. (kupaih). Tannin content, 16.6 per cent. It is accompanied by a certain amount of resinous matter. The tree grows to some size. It is a rare tree except in the forests along the course of the river Monda-ih. The bark is thick and of a ligneous structure. The fracture is whitish-red, and the corky layer readily breaks into small fragments. The fragrant balsam, known in commerce as balsam copaiba, was extracted from this tree at an early date by the Jesuit missionaries.

FAMILY EUPHORBIACEÆ.

Alchornea triplinervia Muell. (tapia gwazú-íh). Tannin content, 11.7 per cent. The tree is abundant and grows to a good size. The bark is quite thick and without bast fibers. Its texture is granulose and fragile. It is easily removed, and has a reddish fracture.

Croton succirubrum (?) (sangre de drago). Tannin content, 11.7 per cent. Resinous matter with a very penetrating odor is present. The tree is small. It is rare in the forests of the uplands but abundant along the rivers. The bark is smooth and easily removed. It is thin, quite fibrous, and has a white fracture.

FAMILY FABACEÆ.

Salbergia sp. (yhsapih-íh). Tannin content, 5.8 per cent. The tree is stout and quite abundant. The bark is smooth and readily removed. It is slightly ligneous and has a blackish fracture.

FAMILY GUTTIFERÆ.

Rheedia brasiliensis Planch & Trianan (pakuri). Tannin content, 21.6 per cent. A small amount of resinous and coloring matters is present. The tree bears fruit, is slender, and attains a height of 40 feet and more. The bark is smooth and easily removed. It is brittle and has a pale-red fracture.

FAMILY LAURACEÆ.

Ocotea sp. (yhvá-ikâ). Tannin content, 10.8 per cent. Large amounts of a mucilaginous substance are present. The tree is stout, tall, of frequent occurrence in the forests and often used for lumber. The bark contains few fibers and is grayish when freshly broken.

FAMILY MELIACEÆ.

Cabralea sp. (cancharana). Tannin content, 5 per cent (in the young bark). The tree attains a good size, is exceedingly abundant, and is occasionally used for lumber. The mature bark is rather thick and somewhat fibrous. It is difficult to remove and has a whitish fracture.

Cedrela tubiflora (?) (cedro). Tannin content, 12.6 per cent. The tree is largely used for lumber and is common throughout Paraguay. The bark is quite thick, composed of tenuous and fibrous layers superposed. The corky portions are fissured. It is easily removed and has an irregular, reddish fracture.

Two other allied species, containing about the same percentage of tannin in the bark, are also found in Paraguay.

Guarea sp. (guaré). Tannin content, 10.02 per cent. The tree is abundant and of medium size. The bark is easily removed, is ligneous, and has a whitish fracture.

Trichilia catigua A. Juss. (kaátiguá puihtâ). Tannin content, 20.5 per cent. It also contains a large amount of coloring matter. The tree is quite common. The smooth bark is easily removed in strips. It is readily broken and has a dark-orange fracture. The bark is used somewhat for tanning, but gives to the leather an undesirable harshness.

Trichilia hieronymi Griseb. (kaátiguá morôtî). Tannin content, 23 per cent. A large amount of a yellow-rose coloring matter is present. The small tree is very common throughout Paraguay. The bark is smooth and readily removed in longitudinal strips. It is easily broken and has a whitish-red fracture. The bark is frequently used locally by tanners and is also employed to dye cotton fabrics.

FAMILY MIMOSACEÆ.

Enterolobium timboüva Mart. (timbó). Tannin content, 22.3 per cent. A certain amount of resinous matter is present. The tree attains a large size, is very common, and is used for lumber. The bark is thick and has a corrugated epidermis and woody bast. The fracture of the young bark is white; that of the mature bark is reddish. It is extensively used by local tanners.

Inga affinis D. C. (inga gwazú). Tannin content, 25.8 per cent. The tree is stout and grows in profusion along the banks of creeks and rivers. The bark is smooth, easily removed from the tree, and deficient in bast fibers. It is brittle and has a whitish-red fracture.

Mimosa sp. (yukerí gwazú). Tannin content, 10.8 per cent. The tree possesses spiny branches and is quite abundant in certain localities. The bark is thick and its fracture is dark yellow. The epidermis is corrugated and quite ligneous.

Peltophorum dubium Taub. (yhvrihrá puihtâ). Tannin content, 31.2 per cent. A very large amount of coloring matter is present. The tree is very common throughout Paraguay and grows at times to an unusually large size. The bark is thick and corrugated and very ligneous. It is easily detached from the trunk in long strips and has a red fracture.

Piptademia rigida Benth. (kurupaih-râ puihtâ). Tannin content, 28.2 per cent. A moderate amount of coloring matter is present.

The tree attains a great height and resembles the cedar. The bark is ligneous, the epidermis checked and corrugated. It is easily detached from the trunk and has a pale-rose fracture.

A very similar species of common occurrence known as kurupaihrâ morôti, possesses the same tannin content.

FAMILY MYRTACEÆ.

"*Britoa fragrantissima*" (?) (yhvâviró). Tannin content, 9.2 per cent. This small, fruit-bearing tree is found occasionally in great abundance. The bark is smooth, thin, and easily removed. It is somewhat fibrous and has a whitish fracture.

Campomanesia guavirá (?) (yhvavirá). Tannin content, 11.6 per cent. The tree is fruit bearing and highly esteemed. It is well known and of common occurrence, frequently attaining great size. The bark is thin and fibrous, difficult to remove, and has a whitish-yellow fracture.

Eugenia brasiliensis, Lam. (yhvá-poroítih). Tannin content, 43.4 per cent. The wood contains 11.6 per cent and the leaves 16.6 per cent. There is a certain amount of resin and coloring matter present. The fruit-bearing tree is well known and very abundant. In certain low places it forms dense thickets. It attains a height of 33 feet and a diameter of 18 inches. The bark is smooth and closely adherent to the sapwood, especially when the flow of sap is scanty. It is without bast fibers. Externally it is white. The fracture has the color of hazel nuts.

Eugenia michellii Lam. (nanga pirih gwazú). Tannin content, 28.5 per cent. But little other extractive matter is present. It is very abundant in low grounds, on the banks of small streams. It is apt to be associated with other species of the same genus, quite similar in appearance, and all more or less tanniferous. The bark is thin and smooth, somewhat ligneous, with a whitish fracture.

Eugenia pungens Berg. (yhvá viyú). Tannin content, 10.8 per cent. This is a fruit-bearing tree, quite as well known and highly valued as the yhvá-poroítih. It is larger in size, but of less frequent occurrence. The bark is thin, smooth, and very difficult to remove from the sapwood. The texture is fragile and the fracture has a cinnamon color.

Eugenia sp. (regalito). Tannin content, 15.8 per cent. The tannin is exceptionally pure. The tree reaches a height of about 23 feet. It is less abundant than the allied members of the same genus. The bark is smooth, not very thick, and closely adherent to the sapwood. It is removable in small pieces. The fracture has the color of hazelnuts.

Eugenia sp. (yhvâjhay puihtâ gwazú). Tannin content, 28.7 per cent. The tree is not abundant. It reaches 20 inches in diameter and 40 feet in height. The smooth, thin bark is easily removed. It is without bast fibers and has a whitish fracture.

"*Myrtus edulis*" (?) (yhvá mbopi). Tannin content, 21.8 per cent. The thin, smooth bark is somewhat difficult to remove. It has a whitish fracture.

FAMILY PALMÆ.

Cocos romanzoffiana Cham. (pindo). Tannin content, 6.6 per cent. This palm tree is abundant in all the forests along the coast. It is carelessly destroyed in order to obtain the leaves, which constitute an excellent forage for draft animals. The bark is often used for tanning the choicer grades of leather.

FAMILY SAPINDACEÆ.

Allophyllus edulis Radlk. (kôkû). Tannin content, 10 per cent. The tree is small and very common. The bark is thin, smooth, and difficult to remove. It is without bast fibers and has a yellowish-white fracture.

Cupania uraguensis H. & A. (kambuatâ). Tannin content, 17.5 per cent. The tree is of moderate size and is frequently encountered in the forests along creeks and rivers. The bark is rather thick and closely adherent to the sapwood. It is removable in small pieces by hammering. It is ligneous and has a reddish fracture.

Cupania vernalis Cambess. (yaguarataíh). Tannin content, 15 per cent. The tree is small and fairly abundant. The bark is smooth, somewhat ligneous, and easily removed in large strips. The fracture is of a pale-rose color.

Cupania sp. (cedrillo). Tannin content, 15.8 per cent. The small tree is of scanty development, and is usually found in low places on the banks of creeks and rivers. The thin bark is somewhat adherent to the sapwood. It is fibrous and has a whitish fracture. The natives use it to tan fine skins.

FAMILY SAPOTACEÆ.

Bumeliá obtusifolia R. & S. (pihkásurembiú). Tannin content, 8.4 per cent. The tree is somewhat abundant and of moderate size. The smooth bark is easily removed. It is of a slightly ligneous structure.

It will be noticed from the above that Paraguay is unusually rich in varieties of tanniferous barks. A number are of common occurrence and the tannin content is unusually high. In the event, at a later date, of any very acute shortage in the world's supply of tanning materials, the forests of Paraguay alone should be able to contribute notably toward meeting the demands of international commerce.

BARKS OF ARGENTINA.

As already mentioned, the bark of the true quebracho contains from 6 to 8 per cent of tannin. That of the white quebracho contains 4 per cent. About the same quantity is present in the bark of the red quebracho. Fair amounts of tannin are also present in the barks of other trees, already mentioned in connection with the tannin content of the heart wood, such as "tipa," "quebracho flojo," and varieties of *Cedrela*, all occurring in Argentina.

To these may be added the two trees called popularly "cebil." They occur abundantly in several provinces of Argentina, notably in Salta and Jujuy, remote from quebracho forests, and are extensively used by the tanners of such sections.

Piptademia cebil (Griseb.), red cebil, contains from 15 to 25 per cent of tannin in the bark and from 6 to 7 per cent in the leaves.

Acacia cebil (Griseb.) contains 8 to 12 per cent of tannin in the bark and 7 to 8 per cent in the leaves.

Mimosa farinosa (Griseb.). The bark contains 3.9 per cent of tannin.

BARKS OF BRAZIL.

The tree known as Barbatimão (*Stryphnodendron Barbatimão*), occurs in abundance in the State of Minas Geraes, in the south of Brazil. The bark is stated to contain as much as 60 per cent of tannin. The price at present is $30 per metric ton, laid down in São Paulo or Rio de Janeiro. It makes an excellent leather.

The angico tree is found also in Minas Geraes. The bark contains 28 per cent of a very light-colored tannin, highly valued by tanners. The price at the seaboard is the same as that of Barbatimão.

Remoteness from industrial centers, and the high cost of transportation have hampered any attempt to exploit these barks on an extensive scale.

Eugenia jembos (Linn.) contains 12.4 per cent of tannin.

The following is a list of the local names of barks found in Brazil, which have a very limited use in tanning: Arica, cannella, garabi, genubata, grannaniamba, guabari, hyrsonima, mimusops, monesia, pimento, santarita, schinus mollis, trumpet-wood, vanigra.

BARKS OF CHILE.

Eucryphia cordifolia Cav. (ulmo). The tree occurs in abundance in Chile. The bark is largely used in local tanneries, and the extract is exported to some extent. This extract is of a dark-red color, and strongly resembles that obtained from mangrove bark. The United States purchases annually a small quantity of this extract, valued at about $8,000.

Persea lingue (lingue). Enormous forests of this tree occur in southern Chile. The reddish-brown, soft bark contains from 20 to 24 per cent of a tannin, which is very easily extracted by water. It is of extended use locally for the production of the well-known Valdivia leather. It has been used to some extent in Great Britain in tanning leather to serve for uppers.

Laurus peumo. The bark of this tree also serves locally for making upper leather.

BARKS OF PERU.

The bark of the cascara tree is reported to be in extensive local use for tanning purposes.

The alkaloids present in cinchona bark are largely in combination with quinotannic acid. No attempt has been made to utilize this constituent of Peruvian bark, as far as is known.

BARKS OF VENEZUELA.

Tecoma pentaphylla (roble colorado). The bark of this tree contains 27 per cent of tannin, which is accompanied by a soluble, orange-red coloring matter.

Tecoma leucoxylon (Mart.). This allied variety occurs chiefly in Guiana, where the bark is regularly employed in tanning.

Weinmannia glabra. The bark has a limited use. The wood of the tree is highly valued for cabinet work.

In addition to the above, the barks of the following Venezuelan trees are occasionally employed by tanners: Aguacate, botoncillo, coco palm, gateodo, simaruba, tamarindo, yagrumo, and urape.

BARKS OF MEXICO AND CENTRAL AMERICA.

Oak bark is widely used for tanning throughout Mexico. The local varieties employed for this purpose are *Quercus xalapensis* (Encinos), *Q. castanea*, and *Q. imbricaria* (laurel oak). The last mentioned is also found in Guatemala and used there for tanning.

Mimosa huamuchil. The bark of this variety of mimosa is widely used, especially in Oaxaca, for making suède leather.

Pithelocolobium dulce (huamuchil ó pinzan). The bark is used extensively in Jalisco and Morelos, in tanning saddle and harness leather.

Lysaloma candida (palo blanco). The bark is frequently used.

Acacia malacophylla ó mimosa sp. (timbre ó timbre). This bark is employed largely to tan leather intended for bookbinding and for shoemakers.

Mimosa biuncifera ó acacia, sp. (uña de gato). In Michoacan, this is used in tanning black goatskins.

Calliandra grandiflora (Raicilla). Employed in Morelos for making soft leathers.

Bursera microphylla (Torote) and *Entorobium cyclocarpum* (Huincastle). The bark of both trees are of a very limited use in Mexico. The latter occurs also in Central America. The pods, as well as the bark, are said to be rich in tannin.

Malpighia punicifolia (nancite or manquitta). The tree is abundant in Nicaragua and in the West Indies. The bark contains from 20 to 30 per cent of a very light-colored tannin.

BARKS OF GENERAL OCCURRENCE.

Brysonima (Murici).

Stryphnodendron barbatimum (Mort.) (tuga veca). The bark yields the amorphous Barbatimao tannic acid, an amorphous red powder. Both of the above are of scattered occurrence.

BARKS OF THE WEST INDIAN ISLANDS.

In the West Indian Islands several trees and vines occur, the barks of which contain tannin in industrial quantities. They may be briefly enumerated in order to complete the geographical survey. They are: *Carapa guianensis* (crab-wood); *spondias lutea* (hay plum); *lecythis ollaria* (kararalli); *mora excelsa* (morá); *coccoloba uvifera* (seaside grape), source of a Kino; *nectandra* (sirnahelli); bloodwood; baromalli or pumpwood; cuyama.

TANNINS FROM LEAVES.

There are but few representatives in this class. Mention has already been made of the tannin present in the leaves of the white quebracho of Argentina, and of the extent to which the leaves of mangroves are employed in the tanneries of southern Brazil.

The leaves of yhvá-poroítih, *Eugenia brasiliensis* Lam., so abundant in Paraguay, contain, when air-dried, 16.6 per cent of tannin. They might advantageously be made the object of systematic annual exploitation, for the purpose of extracting the tanning principle.

Guaiacum arboreum (molle-guayacan). The leaves are locally used for tanning in various tropical regions. The tree is closely allied to *Guaiacum officinale*, the well-known lignum-vitæ.

Sumac, obtained in Mexico from the leaves of *Rhus aromatica* (Ait.) and *Rhus copallina* (Linn.) is the most important member of this category. The dry leaves contain about 13 per cent of tannin. Mention has already been made of the value of young fustic wood as a source of tannin. The leaves of this tree, *Rhus cotinus*, contain 17 per cent of tannin. They could also be profitably made the object of a systematic harvesting. These leaves bear easily sea transportation. The different varieties of *Rhus* can advantageously be cultivated, as is now the case in Italy.

The tannin of sumac leaves is very similar to that present in myrobalans, but is somewhat paler in color. It is principally used in the production of light leathers. Sometimes warm sumac liquor is employed to brighten the color of heavy tannages. As a rule, the American varieties are less adapted for making white leather than the Sicilian sumac, on account of the presence of a certain amount of a dark coloring matter. It is to be noted that leather made by the use of sumac tannin is not very resistant to water.

Aspidosperma quebracho blanco (Schlecht). This tree, the "white quebracho" of Argentina, has already been described as having a certain amount of tannin in its wood, viz, 3 per cent. Its bark contains also 4 per cent. The leaves are, however, remarkably rich in tannin, the average amount present reaching 27 per cent. There is probably no other tree occurring abundantly in South America, the leaves of which possess as much value from the tanner's standpoint. No attempt appears to have been made to exploit this source of tannin, probably on account of the great abundance of the true quebracho, side by side with the white quebracho.

In connection with the consideration of the bark of the mangrove, *Rhizophora mangle* (L.), attention has already been directed to the value of the leaves, as rich in tannin, and to their extensive use in the tanneries of southern Brazil.

One of the most interesting occurrences of tannin in the leaves of South American flora is that connected with Paraguay tea, or "yerba de maté." The dried leaves and shoots of *Ilex paraguensis* (A. St. Hil.) are now used by over 30,000,000 inhabitants of South America to make an infusion which, as a beverage, replaces the tea or coffee of other regions.

The tree is an evergreen, closely related to the holly, and grows abundantly in the mountain forests of Argentina, Paraguay, and southern Brazil. In height it ranges from 15 to 30 feet. The leaves are 4 to 6 inches long, lanceolate, with finely serrated margins.

Infusion is made as in the case of Chinese tea. The so-called maté thus obtained is regarded as having valuable restorative qualities when taken after violent or prolonged physical exercise. It also possesses mildly aperient and diuretic properties. The caffeine present is not much in excess of 1 per cent, as compared with 3.5 to 4.5 per cent in teas of oriental origin. The physiological action of the tea, therefore, seems to be narcotic rather than stimulative.

The tannin present in the leaves is also much less than in the case of ordinary tea leaves, being on an average about 1.5 per cent. This tannin is very peculiar in character, as it does not precipitate potassio-tartrate of antimony, and is totally without action on hides and skins. Thus far this tannin remains more of a scientific curiosity than an article of commercial interest.

TANNINS FROM ROOTS, BULBS, AND EXCRESCENCES.

This category has also but a very few representatives in Latin America. There are no tannin-bearing excrescences similar to the nutgalls of Syria and China or the knoppern of Austria, and the number of roots is quite small.

Fuchsia macrostemma (churco). The root bark of this Chilean plant contains 25 per cent of a bright-red tannin. The bark is thin and brittle, and the tannin is easily extracted. It is used locally in Chile for making leather.

Krameria trianria (Ruiz et Pav.) (rhatany). This plant grows in abundance on the slopes of sandy mountains in Peru. The root is woody and branched. The cortex is fibrous, of a reddish-brown color, and is easily separated from the central, reddish-yellow, woody part. It has no smell, but is exceedingly astringent, without being bitter. In commerce it is usually found in the form of powder.

The tannin content ranges from 38.3 to 42.6 per cent. It is much more abundant in the cortex than in the core. In a pure form it is a light yellow powder, quite soluble in water. The extraction by this means is very simple. A certain amount of the concentrated extract is exported. This is not used in tanning alone, but generally as an addition to other liquors. Ruiz, the botanist, was first led to investigate the nature of the root, having noted that it was used by women for rubbing the teeth and strengthening the gums.

Rumex hymenosepalus (Torr.) (canaigre). This plant, known as the sour dock, or wild rhubarb, grows abundantly in those parts of Mexico, seldom visited by rain, where the average temperature is below 20° C. The plant grows to a height of about 3 feet. For centuries the natives of Mexico have used the air-dried, tuberous roots as a material for tanning hides. The name of sour cane (cah na ger) was given the plant by the early missionaries, and this was gradually changed into canaigre.

The roots weigh each from one-half pound up to 2 pounds. They live for five years in the soil. In practice they are gathered when 2 years old. In commerce canaigre is encountered in the form of reddish disks or as a liquid extract. The plant is cultivated to some extent. It is, in fact, the only tanniferous plant in Latin America which can be profitably made the object of systematic culture.

Tannin is found in all parts of the plant—stalk, leaves, flowers, seeds, and roots—but chiefly in the last mentioned, which greatly resemble dahlia roots in appearance. The percentage of tannin is exceedingly variable, depending upon the conditions of growth. An adverse environment favors a high percentage. On the contrary, in a rich, well-irrigated soil the percentage is low. During the annual period of growth the tannin content increases most rapidly at the beginning of summer, when the plant is dying back to the ground. At this period the astringent sap of the leaves retreats into the roots, thus contributing materially to heighten their percentage of tannin. Young roots 3 to 7 inches in length and nearly an inch in thickness contain 10 per cent of tannin. In roots that are 2 or 3 years old the amount present reaches 28 per cent. Trimble states that the pure tannin, which is much like that of mimosa bark, is a yellowish-white powder, readily soluble in water. On boiling with 2 per cent hydrochloric acid it yields an insoluble, red phlobophane, together with some protocatechuic acid.

The tannin is accompanied by certain red and yellow coloring matters, which are extracted at the same time and distinctly affect the quality of canaigre-tanned leather. When a fresh root is cut the surface blackens on account of the dyestuff present. Canaigre root contains also from 5 to 8 per cent of starch, which must be removed by some suitable process in order to obtain good results. Hence, when an extract is prepared the temperature is maintained at from 30 to 50° C.

Typical analyses of air-dried roots give:

	Per cent.
Water	14.7
Tannin	27.8–34.9
Nontannins	9.4–18.1
Ash	1.9– 2.1
Insoluble	33.9
Carbohydrates	6.8

To 100 parts of tannin come 23 parts of carbohydrates.

The dried root and its extract have given very satisfactory results in the tanning of nearly every form of leather. The best results, as regards weight and firmness, are obtained in the finishing of harness leather and in making various light leathers. On account of the easy solubility of the tannin the whole operation of changing hides into leather proceeds with great rapidity. When used alone canaigre imparts to leather a distinctive orange color.

TANNINS FROM FRUITS AND SEEDS.

This group is more numerous than the two preceding groups, and some of its members are commercially of importance.

DIVI-DIVI.

Cæsalpinia coriaria (Willd.) (divi-divi, also libi-libi). The tannin is found in the seed pods. The tree grows to a height of 20 to 30 feet, and is indigenous in the West Indian Islands, Mexico, Venezuela, and northern Brazil. Its pods are about 3 inches long and three-fourths inch broad. They are very thin and smooth. After drying they frequently resemble in shape the letter S. The color is a chestnut brown.

The pods contain from 40 to 45 per cent of a tannin very similar to that present in valonia. This tannin is most abundant in the tissue of the pod, under the epidermis. There is little in the seeds. A typical analysis of the pods gives the following results:

	Per cent.
Water	13.5
Tannin	41.5
Nontannins	18.0
Ash	1.6
Insoluble	25.4
Carbohydrates	8.4

To 100 parts tannin come 20.2 parts carbohydrates. The tannin consists of a mixture of ellagitannin and gallotannin. It is accompanied by a considerable amount of oily and mucilaginous matter.

Divi-divi tannin is easily separated in the form of a concentrated extract. This latter, as well as the ordinary solutions for tanning purposes, on account of the presence of the above-mentioned foreign matters, are liable to undergo sudden fermentation, especially during electrical storms. In the course of fermentation a deep-red coloring matter is developed, which imparts to leather a dark stain. It is a problem not yet solved how this fermentation may be effectively avoided. The use of ordinary antiseptics has been of some assistance as a preventive.

Divi-divi is an exceedingly cheap source of tannin. Its use is, however, not very extended. As a rule, it is mixed with various barks or their extracts. Leather made by the use of divi-divi extract alone is apt to be firm in dry weather but soft and spongy in damp weather. Ordinarily it is used as a substitute for gambier in the dressing of leather and in the rapid drum-tanning of light leathers. Sometimes its use in connection with leather is simply as a dyestuff.

Divi-divi was first imported from Caracas, in 1769, by Spaniards. By 1848 it had come into widely extended use. The chief ports of shipments are Caracas and Maracaibo.

The name is said to be derived from David Davis, the captain of the first ship to bring to Europe a cargo of the pods.

The present consumption of divi-divi pods in the United States is not large. During the fiscal year ended June 30, 1914, 29,000 pounds were imported. The price per pound at the ports of shipment was 1.6 cents. The best known marks are Curacao, Maracaibo, and Monte Christo. Shipments are chiefly from Maracaibo, Parahiba, and Santo Domingo.

The consumption of divi-divi in Germany is much more important. During 1913 the exportation from Colombia amounted to 951 metric tons and from Venezuela to 5,092 tons. The average value per metric ton at the ports of shipment was $4.76.

Cæsalpinia tinctoria (H. B. K.; Berth.) (Bogota divi-divi). *Cæsalpinia sigyna* (Rottl.) (tari). The pods from these varieties, as well as the so-called "false divi-divi," from other members of *Cæsalpinia*, differ but slightly from those of *C. coriaria* in appearance and tannin content, and are occasionally encountered in commerce.

ALGAROBILLA.

Cæsalpinia brevifolia (algarobilla; algarobito; algarobo). This plant occurs in sandy, dry regions of northern Chile, and also in Colombia. The pods, which contain three to six seeds, are cylindrical in form, sometimes curved, sometimes straight.

These pods contain from 35 to 53 per cent of tannin, which is very readily extracted. This tannin appears to be a mixture of ellagitannin and gallotannin. It lies in semiresinous particles, adhering loosely to the somewhat open framework of the fiber. It is accompanied by notable amounts of a yellow coloring matter.

A typical analysis is the following:

	Per cent.
Water	13.5
Tannin	43.0
Nontannins	20.0
Ash	1.6
Insoluble	21.9
Carbohydrates	8.2

To 100 parts tannin come 19 parts of carbohydrates. Concentrated extracts of algarobilla tannin are easily prepared. They are, however, as in the case of divi-divi extract, although to a less degree, somewhat prone to undergo fermentation.

When used in tanning, algarobilla gives much better weight and greater firmness than is the case with divi-divi. It is also less liable to cause discoloration of the leather. The best grades yield a light-colored liquor, which colors leather but slightly, imparting a light, reddish-yellow tint. After the extract has undergone fermentation it produces a leather of an exceedingly bright color. Experience has shown that it gives inferior results for sole leather, and that in general, when employed alone, the leather produced is apt to mold in the sheds. It is, therefore, in almost all cases, blended with other tanning materials, its exceptionally high tannin content serving to strengthen the weaker liquors. It is usually blended with myrobalans, divi-divi, quebracho extract, or hemlock extract. In practically all cases it can replace catechu for blending.

In consequence of its dyestuff content, algarobilla is occasionally used simply as a coloring material, especially on leather.

Algarobilla is one of the very strongest tanning matters known. There are, however, some closely allied trees in Chile, which yield pods of an even higher tannin content. They are: *Balsamocarpum brevifolium*, 65 per cent of tannin; *Prosopis pallida*, 60 per cent; and *Prosopis dulcis*, 62 per cent. They are less abundant, but the pods are held locally in high esteem.

Data on the commercial movement of algarobilla are lacking.

Cæsalpinia cacolaco (cascalote). The tree is very abundant in several districts of Mexico, and the pods have formed from time immemorial the chief tanning material of the country. Toluca is the most important point of distribution of the product. Other centers are the towns of Iguala, Morelia, Patzcuaro, Uruapan, and Zitacuaro.

The tannin content is very high. Cascalote has an advantage over divi-divi, in containing a much lower percentage of mucilaginous substances. It gives good results in the manufacture of sole leather, and most other forms of leather, including morocco, glazed kid, box calf, enameled colt, pigskins, etc.

The native method of tanning with the aid of cascalote is exceedingly novel. Prepared hides are first placed for two days in a vat with a "weak" or "sweet" tan liquor, until the hides have uniformly taken the color. They are then removed and sewn up into bags, roughly reproducing the original shape of the animal. These are filled with a stronger tan liquor and a quantity of ground cascolote. The filled hides are then placed in rows on the pavement of the tannery court. The liquor slowly oozes out, and flows into a central pit, whence it is pumped from time to time to refill the hides. The strength of this liquor is retained by new additions of cascalote. The operation continues for about 15 days. For a part of the time the bags are piled upon each other, to the extent of six or eight tiers. The pressure on the lower tiers increases the rate at which the liquor oozes through the hides, and produces a remarkably good tannage. The liquor is finally withdrawn, the sewing ripped out, and the hides are placed in a lay-away vat for a week or longer. They are then ready for the finishing processes.

The consumption of cascalote in Mexico is very great. In the city of Leon, for example, there are 26 tanneries, consuming daily 13,250 pounds of the pods. The price ranges from 3.2 to 3.4 cents per pound. In Mexico City the normal price is $54 per ton. The State of Guerrero supplies annually 500 tons, and the output could be notably increased. There is an unfortunate tendency in some regions to destroy the cascalote trees, in clearing sections for tillage, without seeking to start new plantations in areas less desirable for the needs of agriculture.

There is a certain export of cascalote, but the figures do not appear in American, British, or German statistics.

Paullinia sorbilis (guara). The small tree is found in Brazil and in Colombia. The pods resemble those of cascalote. They contain, however, 55 per cent of tannin. The ground pods are easily extracted, and the liquor is used to make a very light-colored, brownish-yellow leather.

The value of this unusually rich tanniferous fruit has been recognized within the past two years. It may possibly prove to be an important addition to the current supply of tanning agents. (Journal of the American Leather Chemists' Association, 1914, vol. 9, 214.)

Paullinia cupana (H. B. & K.) (guarana). The seeds contain considerable amounts of both caffein and tannin, and are extensively used in South America for medicinal purposes.

MINOR FRUITS AND SEEDS.

Punica granatum (pomegranate). The fruit rind contains 13.6 per cent of a tannin, resembling closely that of myrobalans. It is accompanied by a considerable amount of starch. The tannin content is most marked in a bitter variety, which is used in preparing morocco leather. The root bark is also rich in tannin.

Inga feuillei (pay-pay). The pods of this Peruvian tree contain 24 per cent of an almost colorless tannin.

Enterolobium cyclocarpum (Jacq.; Griseb.). The tree occurs in Mexico and Central America. The pods and also the bark are rich in tannin.

Acacia albicans (hiusache, huinacastle). The tree occurs in Mexico. The pods are used as a substitute for gallnuts. Locally the cost is about 10 cents per pound.

Acacia cavenia (espinillo). The tree is encountered in Argentina. The husks of the fruit contain 33 per cent of tannin.

Guaiacum officinale (lignum-vitæ). The pods are about three-fourths of an inch in length. The seeds possess a leathery pericarp and contain a notable amount of tannin. In Argentina they are used for tanning purposes.

Chrysobalanus icaco. The dried fruits of this Chilean tree resemble closely the myrobalans of India. A large amount of tannin is present in the pulp which surrounds the kernel of the fruit. This latter is about the size of a hazelnut. The tannin content consists of gallotannic and ellagitannic acids. By itself it produces a soft and porous tannage. It is generally used in combination with other dark-colored materials for the production of sole leather and as a cheap substitute for sumac on lighter forms of leather. Thus far the Chilean variety of myrobalans does not appear to have entered into international trade.

Mention finally might be made of the large amount of tannin present in the berries of the coffee tree, *Coffea arabica* (Linn.). The varieties encountered in South and Central America, notably in Brazil, contain 21 per cent of tannic and caffetannic acids, both in the form of their calcium and magnesium salts. Thus far no attempts have been made to utilize coffee berries as material for tanning. They remain among the potential reserves.

SUMMARY.

The sources of tannin of industrial importance to be found in Latin American countries may be summarized as follows:

Woods	12
Barks	102
Leaves	9
Roots	3
Fruits and seeds	17
Total	143

Should the time ever arrive when southern Africa, Australia, and the Far East are unable to meet the world's demands for the special forms of tanning material, now supplied by them in comparative abundance, there is no question but that the needs of tanners in all countries can be easily and fully met by utilizing the vast and inexhaustible storehouses of tannin, revealed by a careful study of the forest treasures of Latin America.

○

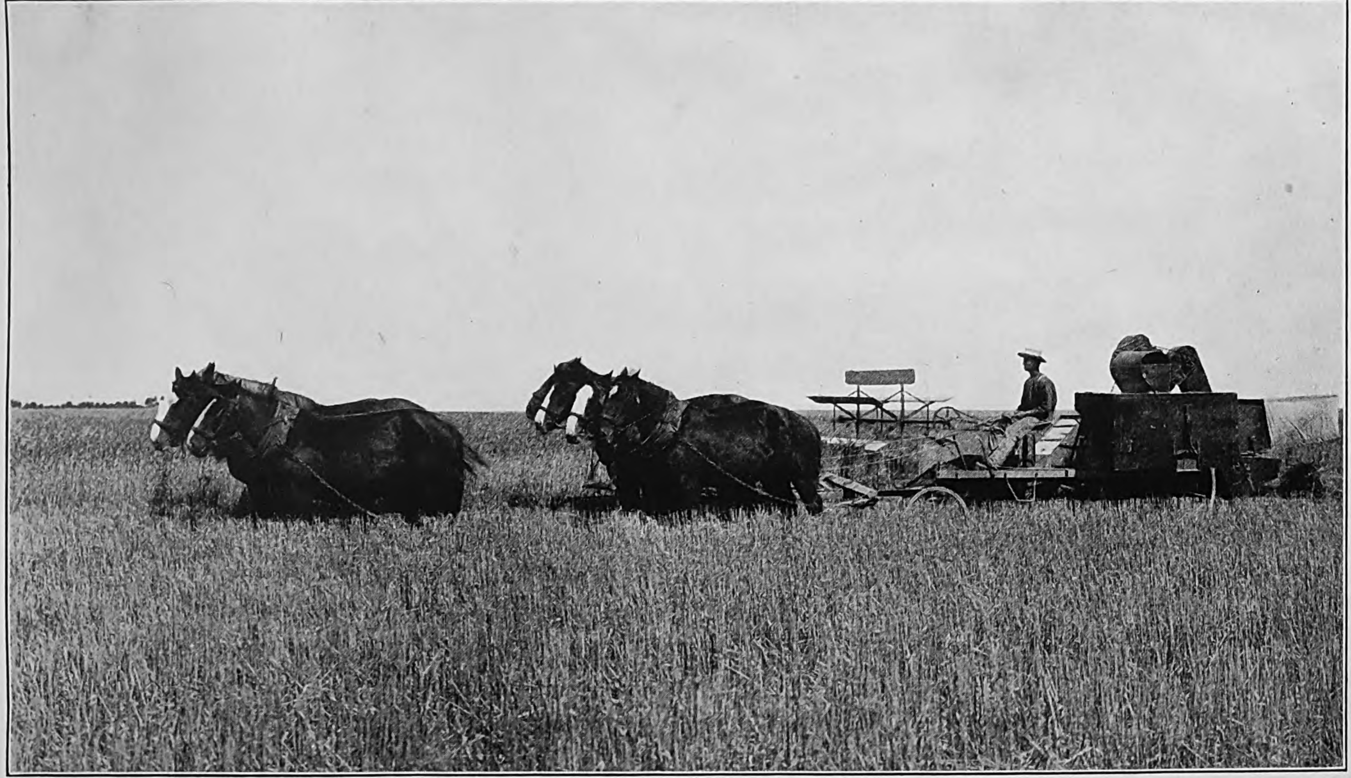


FIG. 1.—REAPER-THRASHER CUTTING, THRASHING, AND GRADING WHEAT CROP IN VICTORIA AT THE RATE OF 15 TO 20 ACRES PER DAY.

C 18.11:166

DEPARTMENT OF COMMERCE
BUREAU OF FOREIGN AND DOMESTIC COMMERCE
B. S. CUTLER, Chief

SPECIAL AGENTS SERIES—No. 166

AGRICULTURAL IMPLEMENTS AND MACHINERY IN AUSTRALIA AND NEW ZEALAND

By

JUAN HOMS
Commercial Agent

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LETTER OF SUBMITTAL.

Department of Commerce,
Bureau of Foreign and Domestic Commerce,
Washington, May 1, 1918.

Sir: There is submitted herewith a report on the markets for agricultural implements and machinery in Australia and New Zealand, by Commercial Agent Juan Homs. This is the second and final monograph resulting from Mr. Homs's investigation in foreign countries, the previous one (Special Agents Series No. 146) having covered the Union of South Africa, Rhodesia, and certain of the less important regions in that part of the world. Following the uniform plan outlined for this commercial survey, the present book takes up topography, climate and rainfall, soil conditions, the character of the population, the labor situation, the activities in agricultural education, and, in the main, all those aspects of the subject that have even an indirect bearing on the market for farm equipment. There is a discussion of all the leading crops and the means employed to produce them. Trade methods are considered and appropriate recommendations made. Statistics of imports are presented, an account is given of the domestic manufacture of agricultural equipment, and the general conditions in the implement trade are covered in such a way as to indicate the degree of opportunity that exists for increased sales of American goods. There is a detailed description of the market for each particular line, and Mr. Homs gives special attention to the machines (such as stump-jump implements) that have been devised and developed in Australia and New Zealand to meet specific local needs. It is believed that American manufacturers who contemplate a more vigorous campaign in these markets should derive much valuable information from this book.

Respectfully,

B. S. Cutler, *Chief of Bureau.*

To Hon. William C. Redfield,
Secretary of Commerce.

AGRICULTURAL IMPLEMENTS AND MACHINERY IN AUSTRALIA AND NEW ZEALAND.

Part 1. AUSTRALIA.

I. INTRODUCTION.

LOCATION, AREA, AND POPULATION.

The Australian Commonwealth, which comprises the island continent of Australia and the island of Tasmania, is situated in the Southern Hemisphere, between longitudes 113° 9′ and 153° 39′ E. Its northern limit is latitude 10° 41′ S. (corresponding to Greytown, Nicaragua, in the Northern Hemisphere); the southern limit of the continent is 39° 8′ S. (corresponding to Indianapolis); including Tasmania the Commonwealth extends to 43° 39′ S. (corresponding to Bay City, Mich.). On the west it is bounded by the Indian Ocean, on the east by the Pacific Ocean, on the north by the Timor and Arafura Seas and Torres Strait, and on the south by the Southern Ocean and Bass Strait.

Australia is a self-governing British Dominion, formed on January 1, 1901. It is composed of six States and two Territories, with an area and estimated population, at the end of 1914, as follows:

States and Territories.	Area.	Population.	Capital.	Population of capital.
	Square miles.			
New South Wales	309,460	1,861,522	Sydney	752,500
Victoria	87,884	1,430,667	Melbourne	674,000
Queensland	670,500	676,707	Brisbane	154,011
South Australia	380,070	441,690	Adelaide	205,443
Western Australia	975,920	323,018	Perth	122,400
Tasmania	26,215	201,416	Hobart	40,000
Northern Territory	523,620	3,973	Port Darwin	600
Federal Territory	912	1,959	Canberra[1]	1,000
Total Commonwealth	2,974,581	4,940,952		1,949,954

[1] Melbourne is still the seat of the Federal Government, but this will eventually be transferred to Canberra, where the construction of official buildings, private dwellings, etc., for the purpose is well under way.

The area of Australia is practically equal to that of the United States, exclusive of Alaska. The total length of its coast line is approximately 12,000 miles, which gives an idea of the enormous distances between various places in the country.

British New Guinea, although not included in it, is under the administration of the Commonwealth. Lord Howe and Norfolk Islands are also small dependencies of Australia.

Approximately 80 per cent of Australia's population is concentrated in the States of New South Wales, Victoria, and Queensland. Nearly 40 per cent of the total population is to be found in the metropolitan areas—that is, in the six capital cities and the territory immediately adjacent. Including aboriginals, the density of population is only 1.69 persons to the square mile, making Australia the most sparsely populated civilized country in the world. The Northern Territory, in particular, is very thinly peopled, this being due to its lack of communications, the tropical nature of its northern districts, and the desertlike appearance of its southern ones.

Nearly 97 per cent of the white population is composed of persons born either in Australia or in the United Kingdom. English, consequently, is the language spoken throughout the country, and for the same reason its currency, weights, and measures are the same as those used in Great Britain. The foreign population of Australia consists mainly of 32,000 Germans, 36,000 Asiatics, and several thousand Greeks. According to the census of 1911, the number of full-blooded Australian aboriginals employed by whites, or living near white settlements, was 19,939. There is considerable doubt as to the exact number of aboriginals in the country, but it is generally believed to be about 100,000.

During the years 1901 to 1914, inclusive, the increase of population by immigration was 230,931. Considering that Australia is a newly settled country, and comparing it with the new countries of North and South America, one finds this increase rather disappointing. The great distance of Australia from Europe, as compared with the United States and Canada, is not conducive to large immigration. Certain restrictions and tendencies growing out of the prevailing policy of the Commonwealth have also had a very material effect.

During the same period the natural increase in population (excess of births over deaths) was 944,682. On March 31, 1917, the estimated population of Australia was 4,886,502, representing a decrease of 54,450 from the estimate for the end of 1914. This decrease is to be accounted for entirely by the large number of men who left the country for the various war zones.

CHIEF CITIES AND TRADING CENTERS.

SYDNEY.

The capitals of the various States are in all instances the largest cities and the most prominent trading centers.

Sydney is a fine modern city, with 752,000 inhabitants. It has a splendid harbor and claims fifth place, in amount of cargo handled, among the world's great ports. It has good, comfortable hotels and every modern convenience and facility. Owing to the progress made by New South Wales in mixed and general farming, the Sydney implement firms carry in stock a large variety of goods. The trade is better divided among a relatively large number of firms than is the case almost anywhere else in Australia, where this business, as a rule, is altogether in the hands of three or four very large firms.

MELBOURNE.

Melbourne is the second largest city of Australia, with 674,000 inhabitants. Perhaps to a greater degree than in any other Australian trade center, the farm-machinery business is in the hands of a few large firms. Implement salesmen, for this reason, may find it rather difficult at times to locate suitable firms with which to negotiate.

ADELAIDE.

Adelaide is a most attractive and prosperous community, possessing all the advantages of a modern city of its size. It has a population of 205,443. The farm-machinery business is fairly well divided among a number of firms, although, because of the fact that nearly 95 per cent of the cultivated area of South Australia is devoted to wheat and oat growing, the demand is chiefly for machines suitable for these crops. Adelaide itself is surrounded by a very fertile and well-watered country, where truck farming and the cultivation of vineyards and orchards are increasingly practiced. For these activities large quantities of implements of all kinds will eventually be required.

BRISBANE.

Brisbane, with 154,000 inhabitants, is growing in importance as a business center. It has a great deal of importance for the American farm-machinery manufacturer because of the fact that the climate of Queensland and the variety of crops grown in that State enable the farmers to dispense with the use of such machines as stump-jump plows and strippers, so necessary when farming in other parts of Australia. American farm machinery in general has proved well adapted for the local requirements and has become very popular in Queensland. The trade is sufficiently well distributed among various firms to justify American farm-machinery salesmen in visiting Brisbane.

PERTH.

Perth is as modern in appearance as any other city of Australia. It has a population of 122,400. While Perth is a rather long distance from Melbourne, agriculture has attained enough importance in Western Australia to warrant a visit by representatives of American firms who may be working in other parts of Australia. The implement trade is in the hands of a fairly large number of firms, which are both solid and enterprising. Western Australia is at present passing through a depressed financial period, chiefly as a result of the severe drought of 1914. For this reason it has also felt more acutely the effects of the war. The business community, however, appears quite justified in anticipating a satisfactory adjustment and return to normal conditions at an early date. Perth is served by the port of Freemantle, half an hour distant by train.

HOBART.

Hobart, the capital of Tasmania, is a city of 40,000 inhabitants, having at present less commercial importance than any of the other State capitals of Australia. Owing to the extensive water-power resources of Tasmania and its central location, it is expected that Hobart will eventually attain considerable importance as a manufacturing city and as a distributing center for goods used throughout the Commonwealth. The number of firms interested in the sale of farm machinery in Hobart is rather small. Mixed farming is engaged in almost exclusively in Tasmania, and the farming community works rather more conservatively than in other parts of Australia. The area under cultivation in Tasmania is relatively small.

MINOR FARM-MACHINERY TRADING CENTERS.

As a rule, the six capital cities of Australia are the only cities in the country that representatives of American farm-machinery manufacturers will find it necessary to visit, though, in a few cases, firms in Bendigo (Victoria), Launceston (Tasmania), Albany, Freemantle, and Bunbury (Western Australia), and Rockhampton and Townsville (Queensland) also import farm machinery direct.

OTHER AUSTRALIAN CITIES.

Australia has more than 150 towns with a population of 3,000 or more inhabitants. The most important among these are Broken Hill, Newcastle, Goulburn, Parramatta, and Wagga Wagga (New South Wales), Ballarat and Geelong (Victoria), Port Pirie and Gawler (South Australia), Queenstown (Tasmania), Kalgoorlie and Geraldton (Western Australia), and Charters Towers, Toowoomba, Cairns, and Mackay (Queensland).

PHYSICAL FEATURES.

The continent of Australia is strikingly devoid of strong topographical features or contrasts. Three-quarters of the land mass lies at altitudes between 600 and 1,500 feet, in the form of a huge plateau. The remainder consists of the low-lying lands comprising the Murray and Lake Eyre basins, partly separated by the Flinders and Barrier Ranges, in the heart of the continent, and of a fringe of land with an elevation of 2,000 or 3,000 feet, culminating in 7,000 feet at Mount Kosciusko, extending through Victoria, eastern New South Wales, and eastern Queensland. Isolated elevated areas, such as the MacDonnell and Musgrave Ranges in central Australia and others at Ashburton, Kimberley, and Arnhem Land, reach 3,000 or 4,000 feet, but they are usually in the nature of bulges on the surface of the plateau rather than true mountain ranges.

Mr. B. R. Wise, in his admirable book "The Commonwealth of Australia," aptly summarizes the outstanding physical characteristics of the continent as follows:

> Roughly speaking, the continent is divided into three distinct kinds of country—the forest lands of the coastal rim, the upland plains of the descending downs, and the central basin of the desert. The coastal districts, rich in alluvial soil, well watered by rivers, and with ample rainfall, grow a profusion of trees and vegetation. As the ground rises toward the mountain range the timber becomes bigger and the forest more dense. On the footslopes creepers, palms, and ferns form a screen of luxuriant foliage, which disappears on the uplands, where the eucalyptus grows in open grassy glades that give the landscape the appearance of a park. Great rolling downs, with frequent clumps

of timber, form the beginning of the inland slope of the dividing range. Gradually these give place to an expanse of treeless plain, which, at one time carrying only a sheep to 10 acres, promises now to rival the wheat fields of Canada. Trees are still found by the river banks, until, as the region becomes more arid, bushes, scrubs, and dwarf eucalyptus, with belts of pine at intervals, give place to a scant and inferior vegetation. The belt of good land is naturally widest toward the north, where the rivers running into the Indian Ocean drain extensive areas, and narrowest on the southern coast. In the southwest corner of the continent are extensive forests of jarrah; and Western Australia has another great forest belt, some 350 miles in length by from 50 to 100 in breadth, which is not on the coastal side of the range, but extends eastward toward the interior. The northwestern and northern districts, which are not yet much known, have the characteristic scenery of the Tropics, with the peculiarity that behind the coast line, at no greater distance than 100 miles, runs a plateau of dry and healthy pastures, which is said to be also capable of growing wheat. The eastern portion of Tasmania recalls England as much by its climate as by the hedgerows that divide its fields. The western portion of the island, on the contrary, is a land of perpetual rain, where the forest is so dense that walls can be built on a tangle of creepers and fallen trees 30 feet or more above the ground.

CLIMATE.

An important factor to consider in connection with Australia's climate is that more than one-half of the area of Queensland, Western Australia, and the Northern Territory, or about one-third of the Commonwealth, lies within the Tropical Zone. Moreover, the country extends through nearly 33 degrees of latitude. The climate of Australia, therefore, presents a great variety of features, although, owing to its geographical position and the absence of marked physical features, the continent, on the whole, is less subject to extremes of weather than are regions of similar area in other parts of the world. Latitude for latitude the climate of Australia is more temperate.

The extreme range of shade temperatures in summer and winter, in a very large part of the Commonwealth, is about 80°, or about one-half that of the United States. Along the northern coast the temperatures are even more equable. As one goes southward the range of temperature gradually increases.

The hottest section of the country is the northern part of Western Australia, where the maximum temperature during the summer exceeds 100° for days or, occasionally, even weeks. In the interior of Australia, in dry summers, the temperature sometimes reaches 120° in the shade. The coldest part of the Commonwealth is the extreme southwest of New South Wales and the extreme east of Victoria. The temperature there seldom reaches 100°, even in the hottest of seasons. During dry winters, much of the land south of the Tropics is subject to ground frosts. Tasmania, as a whole, enjoys a moderate and equable range of temperature throughout the year.

The climate of Darwin, in the extreme north, may be compared with that of the West Indies, whereas that of Tasmania, especially during the summer, resembles that of the State of Maine. On the coast, generally speaking, the atmosphere is moist, whereas in the interior it is dry.

Light snow has been known to fall even as far north, occasionally, as latitude 31°, and from the western to the eastern shores of the continent. During exceptional seasons it has fallen simultaneously over two-thirds of the State of New South Wales. During the winter, for several months, snow covers the ground to a great extent on the Australian Alps, where, also, the temperature falls below zero Fahrenheit during the night.

The seasons being reversed south of the Equator, January is usually the hottest month in Australia and July the coldest. The following table gives the temperatures, in degrees Fahrenheit, in the Australian capitals:

Cities.	Relative latitude in United States.	Mean temperature in January (midsummer).	Mean temperature in July (midwinter).	Highest shade temperature recorded.	Lowest shade temperature recorded.
		° *F.*	° *F.*	° *F.*	° *F.*
Melbourne	Louisville, Ky	67	48	111	27
Sydney	Atlanta, Ga	71	52	108	35
Brisbane	Tampa, Fla	77	58	108	36
Adelaide	Memphis, Tenn	74	51	116	32
Perth	Savannah, Ga	73	54	107	34
Hobart	Grand Rapids, Mich	62	45	105	27

II. ECONOMIC CONDITIONS AFFECTING AGRICULTURE.

PRINCIPAL INDUSTRIES OF THE VARIOUS STATES.

Mr. William C. Downs, formerly American commercial attaché at Melbourne, effectively reviews the industries of the various States of the Commonwealth, as follows:

Queensland is preeminently the grazing State of Australia, the number of cattle being equal to that of all the rest of Australia put together. This has led to the establishment of important meat-freezing plants at Townsville and Brisbane. The butter and cheese making industry is also well developed, although meat is the prime consideration of the herders. In its number of sheep it is second only to New South Wales, and it is first in the Commonwealth in the breeding of horses. The tropical coast lands are admirably suited to the cultivation of sugar cane, producing nearly all that is required for the consumption of the Commonwealth. Its forests yield one-quarter of all the timber cut and sawed in the country, and its fruits are abundant, varied, and excellent in quality. In mining it ranks third among the States of the Commonwealth, producing annually more than $14,000,000 worth of gold, copper, tin, and coal.

New South Wales stands foremost in the raising of sheep and second only to Queensland in cattle. The earlier settlement of the State and the division of land into smaller parcels, however, have encouraged the small breeder and led to the more general development of the dairying industry, so that, with only two-fifths of Queensland's number of cattle, it produces 84,400,000 pounds of butter and cheese, against 45,700,000 pounds for the northern State. The western slopes of the mountains have also proved admirably adapted for the growing of wheat, and in normal times some 38,000,000 bushels are marketed annually. Rich in gold, silver, tin, and copper mines though it is, its prominence as the chief mining State of the Commonwealth is due largely to the magnificent coal fields of Newcastle, with an annual output worth $24,000,000. The recent establishment at that port of a $7,000,000 steel plant will add greatly to the importance of New South Wales as a manufacturing State.

Victoria ranks next in the pastoral industry and has intensified its production by closer settlement. With only 60 per cent as many cattle as New South Wales, it manufactures nearly as much butter and cheese, namely, 78,300,000 pounds. Its fertile fields also yield 32,000,000 bushels of wheat. Gold is the chief mineral produced. In fact, the rapid settlement of the State was due to the discovery of the rich gold fields of Bendigo and Ballarat, and again it was the necessity of finding employment for the surplus influx of unsuccessful fortune seekers that led to the inauguration of the protective tariff policy in Victoria and laid the foundations of its preemience as the chief manufacturing State of Australia.

South Australia's production is mostly agricultural, its yield of wheat and barley being more per capita than that of either New South Wales or Victoria. Olive and almond groves are features of the landscape around Adelaide, and, in general, the farming is of an intensive kind, conducted on smaller holdings than in the other States. The pastoral industry is also well developed, more than 4,000,000 sheep grazing over the broad ranges of the State. Although the total number of its cattle is not one-third that of Victoria, nearly half of them are fine dairy stock. In all the States of Australia fine grapes are grown, but South Australia can truly be called the "Vineyard State," producing 2,700,000 gallons of wine out of the total of 4,700,000 produced in the entire Commonwealth.

In the northwestern part of the continent, in Western Australia, cattle is king. The meat-packing industry, however, is not greatly developed, and the cattle are shipped on the hoof to Java, the Far East, and the Philippines. The pearl fisheries of Broome, in this State, furnish a considerable increment to the revenues. They are the most important in Australia, employing 380 boats and producing some $1,500,000 worth of pearl shell annually. Farther south in the State the conditions favorable to sheep grazing are again found, the flocks of Western Australia rivaling those of South Australia in size. Here also agriculture has received attention with gratifying results, a total of 13,000,000 bushels of wheat having been produced in 1913. The forests of the lower corner have already been mentioned. From them are derived 218,000,000 feet out of the total of 683,000,000 cut and sawed in the Commonwealth. It is, however, on account of its gold production that Western Australia is best known, the world-famous Coolgardie region supplying 60 per cent of the total of the precious metal drawn from the rich deposits of Australia, the third greatest gold-producing country in the world. The lack of water on these eastern gold fields has led to heavy expenditures on the part of the Government in the sinking of artesian wells and the construction of reservoirs, pipe lines, and pumping stations.

Tasmania may be called the "orchard of Australia." Although Victoria has 67,000 acres devoted to orchards and fruit gardens, Tasmania, with only one-fourth the total area, gives up 32,000 acres for that purpose and markets 1,925,000 bushels of apples per year, valued at $1,959,000. The other principal sources of wealth of the island State are its well-known copper and tin mines and its valuable hardwoods. It also has the advantage of abundant water power convenient to its largest cities, which, when utilized by hydroelectric plants, as is now contemplated, may greatly stimulate the establishment of manufacturing enterprises within its borders.

The Northern Territory has little economic importance at this time. It is essentially a pastoral region, suitable chiefly (in fact, almost solely) for operations by large companies capable of opening up the country without the need of immediate returns. In 1910 the imports and exports of this Territory, including all business done with the various Australian States, amounted to about $260,000 and $1,350,000, respectively. At the end of 1915 there were in existence 231 pastoral leases covering more than 64,000,000 acres. Three firms—the Bovril Estates, Vestes Bros., and J. Bradshaw—have under lease a total of 26,000 square miles, equal to the area of England, for which they pay an annual rental of $13,000. In December, 1914, the Territory had 414,558 cattle, 70,200 sheep, and 21,985 horses, and only 391 acres under crop—a proportion of a little more than 1 acre in every 1,000,000 acres.

The following table shows the 1914–15 imports and exports of Australia by States, giving an idea of their relative economic importance:

Political divisions.	Imports.	Exports.	Total.
New South Wales	$132,969,092	$139,366,796	$272,335,888
Victoria	102,441,333	57,861,273	160,402,606
Queensland	31,285,210	63,203,936	94,489,146
South Australia	23,108,522	17,249,295	40,357,817
Western Australia	19,398,833	15,105,136	34,503,969
Tasmania	3,947,973	2,026,659	5,974,632
Northern Territory	407,365	62,739	470,104
Total	313,558,328	294,875,834	608,534,162

IMPORTANCE OF FARMING IN PRODUCTION OF WEALTH.

The approximate value of the output of the various Australian industries during the year 1915 was $1,224,336,000, distributed as follows: Agricultural, $358,996,000; pastoral, $319,276,000; dairy, poultry, and bee farming, $102,936,000; forestry and fisheries, $28,113,000; mining, $108,995,000; manufacturing, value added in process of manufacture, $306,020,000. The aggregate wealth production of Australia in 1908 was $824,785,000; in 1910, $938,670,000; in 1913, $1,080,224,000; and in 1914, $1,047,425,000.

As these figures indicate, the industries of the land are by far the most important source of Australia's wealth. Owing to their significance in connection with the market for farm machinery, a detailed review of Australia's agricultural and pastoral industries has been reserved for subsequent chapters.

MANUFACTURING VERSUS AGRICULTURE.

The remarkable industrial development of Australia is the result of accident rather than natural conditions. The country, with its enormous expanses of land suitable for farming, would doubtless have profited more if its population had become more largely engaged in the industries of the soil instead of taking up manufacturing. The discovery of gold, however, attracted a population essentially industrial in character. Coming to Australia, as it did at the beginning of the second half of the last century, in too great numbers, it failed in many cases to find employment or opportunity in connection with the development of mining. This surplus of labor, showing a disinclination to offer itself for agricultural work, and remaining unemployed in the cities, created an acute problem for the Government. With a view to remedying the situation, Victoria, and to a less extent New South Wales, finally determined upon a policy of industrial encouragement and protection. By means of the tariff, bonuses, and bounties, a great impetus was given to the local manufacture of many articles that had previously been extensively imported. While the results have doubtless justified, in certain instances, the favor thus extended to manufacturing, it is contended by some that this has seriously retarded the growth of the more natural industries of the country, particularly agriculture and mining. There is a feeling that the high cost of materials may at times prove a serious impediment to the active working of the mines, and may also affect, even more adversely, the progress of agriculture. The high cost of industrial production may conceivably impair the ability of the Australian farmers to compete in foreign markets with the farmers of other countries, who are able to acquire machinery and other supplies on a more favorable economic basis.

FOREIGN TRADE.

The following table shows the foreign trade of the Commonwealth in recent years:

Trade.	1911	1912	1913	1914–15	1915–16	1916–17
Imports	$325,899,772	$380,360,773	$388,098,508	$313,558,328	$377,256,637	$367,243,454
Exports	386,799,153	384,920,684	382,370,638	294,875,834	363,908,699	418,618,466
Total	712,698,925	765,281,457	770,469,146	608,434,162	741,165,336	785,861,920

Of the $87,000,000 decrease in the value of the exports during 1914–15, as compared with 1913, about $65,000,000 was mainly due to the dry season throughout the Commonwealth. From this cause also the exports of wheat and flour were reduced by about $40,000,000, and of butter by $5,000,000. A reduction of $20,000,000 was experienced in wool exports; this was the joint result of the war and the drought, for although the clip was much smaller by reason of the latter condition, the dislocation of the market, due to the war, was responsible for the holding over of a considerable quantity of wool until the next year. The influence of the war in restricting exports was most pronounced with regard to metals and coal, which, together, were nearly $30,000,000 below 1913, while skins and tallow declined by $12,000,000. On the other hand, the war was responsible for increased exports of meats, leather, and horses, amounting to more than $22,500,000.

The favorable effect of the very good crops of 1915–16 and 1916–17 and the good prices obtained for agricultural and pastoral produce, as a result of the war, is reflected in the increased exports of the past two years. The balance of trade in favor of Australia in 1916–17 affords conclusive proof of the present satisfactory economic condition of the country.

IMPORTS AND THEIR ORIGIN.

The following table gives, by principal sources, a comparison of the imports of Australia in 1915–16 with those in 1908, showing the gratifying growth of exports from the United States to the Commonwealth:

Countries of origin.	1908		1915–16	
	Value.	Percentage of total.	Value.	Percentage of total.
United Kingdom	$122,995,921	51	$171,033,352	46
British possessions	30,318,295	12	57,213,673	15
United States	32,031,303	13	77,204,667	20
Other foreign countries	57,001,314	24	71,804,945	19
Total	242,346,833	100	377,256,637	100

In 1915–16 the United States contributed to Australia's imports more than four times as much as any other country except the United Kingdom. Among the imports from the United States during 1915–16 there were large quantities of wheat, butter, oats, hay, and chaff. This was a consequence of the 1914–15 drought and indicates its severity, since Australia exports these articles in large quantities in normal seasons. Canada, India, New Zealand, France, Japan, and Switzerland are large exporters of goods to Australia. In 1913 Germany contributed nearly 10 per cent to the Commonwealth's imports. Japan has quadrupled its exports to that country since 1908.

EXPORTS AND THEIR DESTINATION.

The following table shows the direction of the Commonwealth's exports, the increase since 1908, and the remarkable growth of the exports to the United States in recent years. American purchases of

Australian products have increased since 1908 to a greater degree than Australian purchases in the United States:

Countries of destination.	Yearly average from 1904 to 1908.		1915-16.	
	Value.	Percentage of total.	Value.	Percentage of total.
United Kingdom	$146,549,782	47	$163,165,948	45
British possessions	62,276,590	20	49,218,633	13
United States	12,083,539	4	85,878,659	24
Other foreign countries	91,704,326	29	65,645,459	18
Total	312,614,237	100	363,908,699	100

Before the war, France, Germany, and Belgium purchased more goods from Australia than the United States, but in 1915–16 the United States purchased nearly five times as much in Australia as any other country except the United Kingdom. The principal goods shipped to the United States are hides and skins, wool, zinc concentrates, and other metals. It should be noted that Australia's exports to the United States in 1915–16 included about $37,500,000 of specie and bullion.

RAILWAY DEVELOPMENT AND ITS EFFECT ON AGRICULTURE.

At the end of June, 1915, Australia had 22,263 miles of railways in operation, as compared with 13,551 miles in 1900 and 18,012 miles in 1910. Of the total of 1915, the various governments owned and controlled 20,062 miles. In the eastern, southeastern, and southern parts of Australia there are now many lines converging, from the various agricultural, pastoral, and mining centers, toward the principal ports. Among the main lines are those from Adelaide to Melbourne, 482 miles, covered in about 17 hours; Melbourne to Sydney, 582 miles, covered in about 17 hours; and Sydney to Brisbane, 725 miles, covered in about 26 hours.

The Transcontinental Line from Port Augusta in South Australia to Kalgoorlie in Western Australia, a distance of 1,053 miles, has recently been completed. This railway links Western and Eastern Australia by an unbroken rail line, making it possible to go by train from Brisbane, the capital of Queensland, to Perth, the capital of Western Australia. That there are great possibilities in some, at least, of the country along this line is the opinion of Mr. Hunt, the Commonwealth meteorologist. He recently traveled to a point north of Fowlers Bay, 375 miles west of Port Augusta and stated that the popular idea that that part of Australia was a desert was quite erroneous. "There is quite an abundance of grass and salt bush on much of that country," said Mr. Hunt. "I am sure that it would carry sheep well if water could be provided; I am convinced, too, that it is good wheat country. The rain, we already know, falls at just the right time for wheat—in the winter and spring. So far as I can judge, this country is quite equal to the Pinaroo country, which used to be called the 'Ninety Mile Desert,' or much of the 'Mallee' country. It could be very cheaply and easily cultivated." Here is another instance (a repetition of many similar cases) in which eventually a vast section of Australian land, hitherto believed to be altogether barren, will be reclaimed for profitable agriculture.

The construction of the contemplated line from Oodnadatta, in South Australia, to Pine Creek, in the Northern Territory, which when completed will cross the very heart of the continent from north to south, is being deferred for the present. It will doubtless be taken up within the next few years. The total length of the projected line is about 1,240 miles.

Notwithstanding the very considerable extent of the Commonwealth railways, it is obvious, considering the vast area of the country, that there are immense regions which are without railway facilities and in which, as a consequence, little in the nature of permanent settlement has been accomplished. The general policy of the States is to extend the existing lines inland, in the form of light railways, as settlement increases. As a result, a period of railway construction may be looked for in Australia for some time to come.

EFFECT OF THE WAR.

The war naturally had a rather disturbing effect upon the progress and the industries of the Commonwealth during the early days of the conflict. This was greatly accentuated, on different occasions, by the scarcity and high cost of ocean freight. The enormous demands upon shipping in connection with belligerent activities made it very difficult for Australia to be adequately supplied with ocean transportation facilities. Australia, on account of its great distance from Europe, is liable to suffer severely when a shortage of shipping occurs. Its carrying trade is less profitable to the shipping interests, when rates throughout the world are high, than that of countries nearer to Europe. It is quite easy to comprehend, therefore, that under such circumstances the shipping companies, so far as they could control and determine matters, would be likely to divert their steamers to ply on shorter and more profitable routes.

As a result of these conditions, various estimates place the amount of wheat in Australia in April, 1917, waiting for shipment, at between 100,000,000 and 150,000,000 bushels. The Australian Government, with the cooperation of the British Government, took steps long ago to avoid the hardship that this deficiency in shipping facilities would have entailed on the producers. Arrangements, generally considered quite satisfactory, were made whereby wheat and wool growers received a very large part of the value of their product when deliveries were effected by them.

Matters were further aggravated, when the war started, by the fact that the wheat crop of 1914–15 was almost a complete failure. Instead of a normal average yield of 10 bushels per acre, only 2½ bushels were reaped that year. The drought responsible for this unsatisfactory wheat crop also caused a considerable reduction in the number of live stock in the country and, therefore, in the production of butter, wool, frozen meats, and hides and skins.

An important element in the reduced production of Australia since the beginning of the war has been the enlistment of several hundred thousand men, including great numbers from the agricultural districts, in the military forces. The withdrawal of these men from their usual occupations is felt in the various phases of the country's economic life.

All these conditions combined might have served to place the country in a rather precarious position had not confidence been maintained by the fact that all articles produced in Australia were eagerly sought, in order to provide for the requirements of the war. This created very high prices for them, and, also, the British Government took vigorous steps to have facilities provided for the transportation overseas of the less bulky and more urgently needed products, such as wool, wheat, butter, and frozen meats, most of which commodities have been shipped during the past two years in values somewhat greater than before the war. Proof of the confidence prevailing in Australia is given by the fact that in 1915–16 about 3,000,000 more acres were planted with wheat than in the preceding season.

Aided by two good wheat harvests in succession, Australia has passed most creditably through a period beset with really difficult economic conditions, and the war itself, except for the withdrawal of a large number of men from its industries, has only outwardly checked its progress. So far as its established industries are concerned, the country has not experienced any substantial setback as a result of the war. There has been a tendency toward conservatism, of course, and the total trade (as regards quantities) has fallen somewhat below former records, but as a whole the country has supported admirably the strain imposed by the abnormal events of the past three years.

III. GENERAL REVIEW OF AUSTRALIAN AGRICULTURE.

HISTORY AND DEVELOPMENT.

When one considers and analyzes the development of Australian agriculture, since the first days of settlement, it is found that the potentialities, wealth, and productiveness of the soil have repeatedly been underestimated. To the eyes of the first men who took up the task of developing the latent resources of the land, the country as a whole looked rather unpromising. Even 30 years ago few people believed that crops could be grown extensively and profitably in the poorly watered districts at the south of the continent, except in the lands adjacent to the seacoast; yet to-day many millions of acres there are yielding bounteous crops of cereals, and those districts are now looked upon as the future granaries of Australia. They will in time take the place of the better-watered cereal lands of the present day, which eventually will be devoted to mixed farming and dairying pursuits. Western Australia, which during the past 15 years has increased its cultivated area tenfold, was also desertlike in appearance aside from a narrow belt along the coast, and the country as a whole was generally described as incapable of ever supporting a large population. Even the district so forbiddingly known as the "Ninety-Mile Desert," in the south of the continent, has been transformed into a prosperous wheat-growing region where good and profitable crops are now annually harvested with but rare exceptions. Continually, during the past 10 years, most marvelous manifestations have been given of the capabilities of the soil in districts hitherto thought to be almost barren and unfertile. The lands in the "mallee" country, situated in the eastern part of South Australia and extending for several hundred miles into the State of Victoria, have already vindicated themselves; they are contributing to Australia's harvest many millions of bushels of wheat every year. The amount of land still available for agriculture has not, even yet, been definitely ascertained, and, notwithstanding the opinion prevailing until recent years, there is much evidence at present of a growing confidence that many more millions of acres long thought unproductive are waiting to be transformed into good agricultural districts in the years to come.

Much of what has been accomplished in placing Australia among the most promising agricultural countries of the world must be attributed chiefly to the vitality and enterprise of the farmers themselves. Crops are grown in Australia to-day under conditions that demand exceptional intelligence, ingenuity, and unremitting labor on the part of the land workers, and these have solved their many problems with a thoroughness deserving of the utmost commendation. The small and unreliable rainfall of many agricultural districts and the relatively small labor supply have proved serious elements against which to contend. The gradual evolution and rigid adaptation of adequate farming methods, based upon scientific experiments and researches, have solved the first difficulty, whereas the inventive genius of the Australian people, in producing suitable machinery, has largely overcome what seemed almost insuperable labor difficulties. Among other implements, the stump-jump plow and the stripper harvester, two machines evolved for distinctively Australian conditions and brought to a high state of perfection and utility by the Australians themselves, enable the wheat farmers to-day, with a minimum of expenditure and labor, to put large acreages of rather poor land under cultivation and to make them yield profitable crops.

There is no better way to indicate the progress of agriculture in Australia than to enumerate the steady growth in the area of cultivated land during the past 65 years. In 1850 there were only 491,000 acres under cultivation. The number increased to 4,577,699 in 1880, to 8,812,463 in 1900, to 11,893,838 in 1910, while in 1914 the total acreage under cultivation was 15,651,974. This gives, roughly, 3 acres of cultivated land per capita of population, which is a fairly high amount when the comparatively recent settlement of Australia is taken into account. The increase for the whole of the Commonwealth during the past nine seasons was 66 per cent, and in 1914-15 nearly 1,000,000 acres were added to the acreage of the preceding season. Development at present is proceeding at a rapid rate—faster perhaps, than in any other period. The estimates for the season 1915–16 show that the area under wheat was 12,530,233 acres, against 9,651,081 for the preceding season. The war from now on will probably cause a decline in these figures, for tens of thousands of agricultural workers have responded to the nation's call for fighting men, and this fact must necessarily be reflected in a curtailment of agricultural operations.

The progress of land settlement in Australia since 1901 is shown by the following table. The area of the Commonwealth is 1,903,731,840 acres.

Years.	Alienated.		In process of alienation.		Under license or lease.		Unoccupied.	
	Acres.	Percentage of total.	Acres.	Percentage of total.	Acres.	Percentage of total.	Acres.	Percentage of total.
1901.....	76,142,761	4.00	35,060,119	1.84	721,407,284	37.89	1,071,121,676	56.27
1914.....	104,612,364	5.50	54,842,786	2.88	878,981,142	46.17	865,295,548	45.45

AREA UNDER CULTIVATION.

The acreage under each of the principal crops in the several States for the season 1914–15 is shown in the following table:

Crops.	New South Wales.	Victoria.	Queensland.	South Australia.	Western Australia.	Tasmania.	Northern Territory.	Federal Territory.	Total for Commonwealth.
	Acres.	*Acres.*	*Acres.*	*Acres.*	*Acres.*	*Acres.*	*Acres.*	*Acres.*	*Acres.*
Wheat	2,756,343	2,863,535	127,015	2,502,630	1,376,012	23,865	....	1,681	9,651,081
Oats	43,285	434,815	2,728	140,567	96,085	57,063	....	191	774,734
Maize	143,663	19,433	176,372	189	73	....	51	....	339,781
Barley:									
Malting	2,501	31,268	5,367	54,240	3,139	5,415	....	....	101,930
Other	2,360	31,224	1,799	12,075	3,847	421	....	....	51,726
Beans and peas	346	12,944	212	9,873	2,258	15,444	....	....	41,077
Rye	2,853	1,955	81	891	632	1,240	....	....	7,652
Other cereals	....	....	....	1	19	....	....	....	20
Hay	783,107	895,755	79,327	445,832	332,037	89,598	120	2,837	2,628,613
Green forage	[1] 949,539	139,654	184,239	52,656	19,098	6,809	83	80	1,352,158
Grass seed	....	149	1,358	....	....	1,032	....	....	2,539
Orchards and other fruit gardens	53,905	74,302	22,212	25,811	21,378	35,007	50	46	232,711
Vines:									
Productive	6,756	17,728	1,280	22,422	2,315	....	....	....	50,501
Unproductive	1,229	4,073	135	4,442	605	....	....	....	10,484
Market gardens	10,475	12,935	2,648	1,830	2,785	628	60	27	31,388
Sugar cane:									
Productive	6,012	....	108,013	....	....	....	....	....	114,025
Unproductive	5,409	....	53,182	....	....	....	....	....	58,591
Potatoes	30,410	65,495	8,385	7,639	4,778	31,613	....	8	148,328
Onions	284	8,937	175	411	136	86	....	....	10,029
Other root crops	971	2,446	3,728	287	300	3,815	9	....	11,556
Tobacco	1,563	196	614	....	....	....	....	....	2,373
Broom millet	2,027	696	697	....	....	....	1	....	3,421
Pumpkins and melons	2,912	2,329	9,823	166	969	....	12	....	16,211
Hops	....	115	....	3	....	1,427	....	....	1,545
All other crops	1,051	2,775	3,178	399	1,081	1,011	5	....	9,500
Total area	4,807,001	4,622,759	792,568	3,282,364	1,867,547	274,474	391	4,870	15,651,974

[1] Including area fed off.

In all the States there are, in addition, considerable areas devoted to artificially sown grasses, frequently sown on uncultivated land after the timber is burned off. The total area under this category in 1914–15 was 3,451,831 acres, against approximately 1,000,000 in 1901. This increase is largely due to the great progress made by the dairying industry in the past 15 years.

In four of the States—New South Wales, Victoria, South Australia, and Western Australia—wheat growing for grain is by far the most extensive form of cultivation, while in the last three of these States the hay crop is second in importance. In Australia hay consists of wheat, and to a much less extent oats, cut when the crop just begins to turn yellow. In New South Wales, owing to the unusually large area fed off when it became evident, as a result of the drought of 1914–15, that the crop would not mature for reaping, green forage ranks second, hay taking third place. In Victoria, South Australia, and Western Australia the oat crop occupies third place. In Queensland, on the other hand, the three principal crops in the order of their acreage are green forage, corn, and sugar, while in Tasmania hay, oats, and orchards occupy the leading positions. It is well to keep in mind that for the Commonwealth as a whole the wheat, hay, and oats crops compose 83 per cent of the total area under crop.

The area under cultivation is really much greater than the above table indicates, for more than 60 per cent of the wheat, hay, and oats grown are sown on fallow land, and this is not included in the table, which gives only the acreage under crop. This 60 per cent, on the basis of 16,784,920 acres under crop in the season 1915–16, would add at least 10,000,000 acres to the area of cultivated or agriculturally developed land, making a total of approximately 27,000,000 acres upon which farm machinery is at present used in Australia.

POSSIBILITY OF FUTURE EXPANSION.

There is an exaggerated idea in the popular mind concerning the hindrance to the development of Australian agriculture resulting from the small rainfall throughout vast areas of the country. Those entertaining such views must not fail to take into account the enormous size of the country. Allowing that immense areas of Australia do not receive an adequate rainfall and that, consequently, they can not be expected to become suitable for agricultural purposes without irrigation, it should not be overlooked, on the other hand, that the substantial number of 600,000,000 acres receive more than 20 inches of rainfall per annum. Nor would it be justifiable to disregard the fact that there are 600,000,000 additional acres receiving a rainfall of from 10 to 20 inches, of which a good portion can be farmed profitably if one may judge by what has been done hitherto, year after year, in growing wheat in Australia with a rainfall of 15 and even 13 inches per annum.

Although considerable in itself, the amount of land now cultivated in Australia, viewed in relation to the total area of the country, is relatively small, representing less than 1 per cent of the whole. This gives a vivid idea of the immense amount of land still available for development.

While undoubtedly there remain enormous tracts of new land, the adoption of intensive and mixed-farming methods can also be regarded as furnishing much scope for the improvement of Australia's future position as an agricultural country. There is a great deal of land in Australia that is not suitable for mixed farming. Owing to the enormous size of the country, however, there is enough of such land to support many millions of people. In the farming districts of the east coast, in particular, and in Tasmania, a very great deal of progress has already been made along the lines of intensive and mixed farming—in some cases with the aid of irrigation—and the number of men farming on this basis is steadily increasing.

Another important element upon which the growth of Australian farming largely depends is that of immigration. It can not be said that during the past 15 years Australia has pursued a vigorous immigration policy. Official records prove that during that time the increase in the population of the Commonwealth resulting from immigration averaged only 16,000 persons per annum. The need of (and desire for) a greater population is beginning to be felt by all the elements of the Nation, and there is reason to believe that at the termination of the war every possible inducement will be held out to obtain immigration from Europe, chiefly from Great Britain.

It is of interest to note, in this connection, that during the early part of the war Sir Rider Haggard was commissioned by the British Government to visit Australia with a view of ascertaining the attitude of the Federal and State Governments in respect to the facilities and encouragement they would grant to retired soldiers from Great Britain, if the latter desired to take up agricultural or pastoral pursuits in Australia. In the course of this trip Sir Rider was assured by prominent Australian officials that they would heartily indorse any proposition designed to facilitate the settling of a large number of such men upon Australian farms. It is widely felt that the people as a whole would strongly support the Government on this question. In some cases, it was agreed, retired soldiers from Great Britain will be given facilities identical with those extended to returned Australian soldiers. It has been proposed that the Commonwealth Government should provide the funds required for such settlement and that the State governments should furnish the land. The British Government, it is believed, is ready to loan the Commonwealth such funds as it may be necessary to raise in connection with this undertaking. Several official and private training farms, in which inexperienced men will be taught the rudiments of farming, have already been established. It is proposed to enlarge the facilities in this connection, and in other similar ways to help the men, so that they will be adequately informed, familiar with farming practices and operations, and as certain as possible to make a success in that calling. It was estimated at the time Sir Rider Haggard was in Australia that upward of 50,000 families would be settled on the land during the three years following the making of peace, under the arrangements indicated.

It is difficult, for obvious reasons, to speculate at present as to whether industrial conditions in Europe, when the war is over, will be such that the British and other Allied Governments will encourage emigration, even to their colonies and Dominions overseas. If it should be decided to give that encouragement, there will undoubtedly be an era of unprecedented activity in settling people in the Commonwealth, to become engaged in agriculture, and this will involve a considerable demand for farm machinery and implements of all kinds.

SIZE OF FARMS.

The following table gives a classification of the land holdings according to size, as they existed in Australia in 1914–15:

Size of holdings, in acres.	Number of holdings.	Total area, in acres.
1 to 50	73,857	1,094,008
51 to 100	20,888	1,606,763
101 to 500	65,726	16,816,156
501 to 1,000	27,525	19,794,327
1,001 to 5,000	21,297	40,415,647
5,001 to 10,000	1,716	11,349,860
10,001 to 20,000	709	9,812,397
20,001 to 50,000	351	10,240,244
50,001 and over	90	7,800,063
Total	212,159	118,929,465

It will be seen that there is a considerable number of holdings of more than 500 acres. In the wheat-growing areas the farms will undoubtedly remain of from 500 to 1,000 acres and even larger, until new methods are discovered to make possible intensive cultivation with a small rainfall. Wherever the land is adequately watered, however, as is the case along the coast, there will be a tendency to reduce the size of the holdings.

Agricultural labor conditions are not likely, for some time to come, to become more satisfactory than they are at present, and this will gradually induce the landowners to dispose of such lands as they themselves are not able to cultivate. Conditions in Australia are such that any ambitious farm hand, after working a few years for wages, can hope to become a landowner and an independent farmer.

STATUS AND OWNERSHIP OF LAND.

The following table shows the general condition of the land in each Australian State, having regard to (1) the area alienated absolutely, which includes free grants, sales, and conditional purchases for which grants have been issued; (2) the area in process of alienation; (3) the area occupied under all descriptions of leases and licenses; and (4) the area unoccupied, which ordinarily includes roads, permanent reserves, forest, etc.:

Political divisions.	Alienated.	In process of alienation	Held under leases and licenses.	Unoccupied.	Area of State or Territory.
	Acres.	*Acres.*	*Acres.*	*Acres.*	*Acres.*
New South Wales	40,100,492	19,064,618	121,796,091	17,093,219	198,054,420
Victoria	24,138,965	7,362,890	13,325,416	11,418,489	56,245,760
Queensland	16,244,541	10,586,914	331,499,708	70,788,837	429,120,000
South Australia	10,506,471	2,410,137	115,986,348	114,341,844	243,244,800
Western Australia	8,007,937	14,079,386	189,773,915	412,727,562	624,588,800
Tasmania	5,085,868	1,248,844	1,826,805	8,616,083	16,777,600
Northern Territory	474,470	....	104,459,233	230,183,097	335,116,800
Commonwealth [1]	104,612,364	54,842,786	878,981,142	865,295,548	1,903,731,840

[1] The apparent discrepancy in some of the totals is due to the fact that the figures for the Federal Capital Territory are not separately shown, because of their unimportance.

It must be observed that in many cases lands occupied under leases or licenses are held on short tenures only, and could thus be made available for settlement practically whenever required. As a matter of fact, in all the States laws have been passed authorizing the purchase by the Government of alienated lands for the purpose of cutting them into smaller blocks and throwing them open for selection on easy terms and conditions. This indicates that land tenure is not in every way definite. All farmers are liable to be called upon to give up their land if the Government decides to repurchase it. In some quarters the idea has been expressed that it is the purpose of the Commonwealth and of several States eventually to own all the land. This question does not seem to concern the Australian farmers very much at the present time, as the laws passed in this connection by the various governments, whereby alienated land can be repurchased, are thought to be intended solely to put an end to speculative selection without bona fide intention of settlement.

ACQUISITION OF LAND.

Although there is considerable similarity between the principal forms of land tenure in the various States, the terms and conditions vary considerably in detail.

The freehold of land may generally be acquired under what are known as systems of conditional purchase by deferred payments—that is, the settler may purchase the land by the payment of half-yearly installments upon liberal terms. The settler must reside upon his holding and must fulfill improvement conditions of the lightest nature—conditions insisted upon simply to insure that the occupier will become of benefit to the community by exerting a reasonable effort to make his holding productive.

The maximum area that a settler may select in this manner varies from 200 to 2,560 acres, according to the situation and quality of the land. The purchase price ranges from $2.50 an acre upward, and the payment may be extended over a period of from 20 to 40 years, the annual amount payable ranging from $0.12 an acre upward. The selector must ordinarily reside on his holding for at least five years and must carry out certain prescribed improvements, such as clearing the land and inclosing it with a fence. Instead of selecting the land by conditional purchase, a settler may purchase the land outright, or may obtain a lease for an indefinitely long term (called a perpetual lease) upon payment of a small rent. In Queensland and Western Australia free homestead farms of 160 acres are granted to settlers upon residential and improvement conditions.

RAINFALL.

One of the most prominent factors bearing upon the future of Australia, particularly that of its agriculture, is that less than one-third of the country enjoys an annual rainfall of from 20 to 50 inches, whereas the remaining two-thirds receive from about 10 to 15 inches, and even less.

The following table shows the distribution of average rainfall for the various States of the Commonwealth:

Rainfall, in inches.	New South Wales.	Victoria.	Queensland.	South Australia.	Northern Territory.	Western Australia.	Tasmania.	Commonwealth.
	Sq. miles.	*Sq. miles.*	*Sq. miles.*	*Sq. miles.*	*Sq. miles.*	*Sq. miles.*	*Sq. miles.*	*Sq. miles.*
Under 10	44,997	Nil.	91,012	317,600	138,190	513,653	Nil.	1,105,451
10 to 15	77,268	19,912	87,489	33,405	141,570	232,815	Nil.	592,459
15 to 20	57,639	12,626	112,738	14,190	62,920	89,922	937	350,972
20 to 30	77,202	29,317	213,779	13,827	93,470	95,404	7,559	530,558
30 to 40	30,700	14,029	69,880	984	40,690	40,750	4,588	201,621
Over 40	22,566	12,000	95,602	64	46,780	3,376	10,101	190,489
Total	310,372	87,884	670,500	380,070	523,620	975,920	[a] 26,215	[a]2,974,581

[a] Over 3,030 square miles no records available.

The heaviest rains are precipitated along the Pacific Ocean slopes to the north of latitude 30°, from the New South Wales border northward to Thursday Island, on Torres Strait. The quantities are more or less regulated by the differences in elevation from sea level and by the chain of mountains upon which the rain-laden winds blow. The wettest part of Australia is on the north coast of Queensland, between Port Douglas and Cardwell, with an average rainfall of 155 inches. The maximum rainfall there is recorded at Goondi, where in 1894 241 inches of rain fell, although the rainfall records for 1902 give it only 76 inches.

The northwest coast of Western Australia has the lightest rainfall of any coastal district. The driest part of the continent, however, is around Lake Eyre, in South Australia, where the annual rainfall averages only 5 inches and rarely exceeds 10 inches. The inland districts of Western Australia, until recent years, were regarded as the driest in Australia, but as the country has become settled it has been ascertained that the annual average is from 10 to 12 inches. Central Australia has a normal rainfall of less than 10 inches. This dry condition is caused by the fact that the moisture-laden winds from the east are stopped by the dividing range, which causes the rains to precipitate on the seaward slope. It is only in the time of the monsoons and the western trade winds that some of the moisture is carried across to the inland slopes, when the land there quickly becomes marvelously fertile and productive.

Referring to the capital cities of Australia, which are generally in the center of well-developed agricultural districts, it is found that Sydney has the greatest rainfall, with 48 inches. Brisbane has 46, Perth 32, Melbourne 26, Hobart 23, and Adelaide 20 inches. The extreme range of annual rainfall, from highest to lowest, is greatest at Brisbane, with 72 inches, and lowest at Adelaide, with 19 inches.

SEASONAL DISTRIBUTION OF RAINFALL.

At Darwin, in the Northern Territory, practically all the rainfall occurs during the summer months, while little or none falls in the middle of the year. In Queensland also the heaviest rains fall in the summer, although good averages are maintained throughout the year. On the coast of New South Wales the first six months of the year are the wettest, with slight excesses from March to June. The averages during the other six months are fair and moderately uniform, so that there is a tendency toward more uniform annual distribution. The records at Alice Springs and at Daly Waters indicate that in central Australia the wettest seasons are the summer and autumn. The rainfall there, however, occurs at rare and irregular intervals, being generally due to thunderstorms or other local atmospheric conditions. An hour's precipitation, in places where no rain has fallen for a year, will flood all creeks and cover the entire country with a sheet of water. Perth, representing conditions in the southwestern part of the continent, has dry summers and wet winters. In Melbourne and Hobart the rain is fairly well distributed throughout the year, with the maximum in the spring—in October in the former city and in November in the latter. In the south of Australia the rainfall occurs mostly in the winter, chiefly from June to August, which accounts for the fact that in spite of the low average the country is well suited for wheat growing.

The southern parts of Australia, including the central western coast, have winter rains, whereas the northern districts, including the central eastern coast, have summer rains.

It will be seen that, as a rule, the temperate sections of the south of Australia—those best suited for white settlement—have winter rains, whereas the tropical districts of the north have summer rains. In view of the occurrence of winter rains in the south, more particularly in Western Australia, South Australia, and the western districts of Victoria, to the practical exclusion of any rainfall whatever during the summer, and the fact that in those sections of Australia the entire rainfall is obtained during the winter months, it is easy to understand why the growing of wheat, and other similar crops maturing in the early part of the growing season, is practically the only agricultural pursuit that the farmers can undertake with a fair expectation of success, with a rainfall as small as 12 inches per annum. It is beyond reason to hope for the successful cultivation of summer crops, such as corn, etc., in the sections of Australia referred to, unless artificial irrigation is practiced, since no rainfall worth mentioning is obtained during that season of the year.

EVAPORATION—HUMIDITY.

The evaporation of water when fully exposed to the direct rays of the sun and to the wind, etc., is very great in Australia. The average evaporation in the capital cities is as follows: Perth, 66 inches; Adelaide, 54; Brisbane, 50; Sydney, 37; Melbourne, 38; and Hobart, 33. At Alice Springs, in central Australia, the evaporation is 96 inches, and at Laverton and Coolgardie, in Western Australia, 145 and 87 inches, respectively. The question of evaporation is of more than ordinary importance in Australia, since in the drier regions water for human consumption and for irrigation has to be conserved in dams and reservoirs. In the interior of the continent the possible evaporation is greater than the rainfall. It is the rapid rate of evaporation induced by hot and cold winds that injures crops and makes life uncomfortable on the Australian plains.

The humidity of the air is also important as counteracting the effects of evaporation. South and Western Australia, where the average rainfall is low, have an extremely dry climate, whereas the better-watered districts of the southeastern States, New South Wales, Victoria, and Tasmania, are noted for a rather humid atmosphere.

VARIATIONS IN AMOUNT OF RAINFALL REQUIRED.

It has been proved that in South Australia crops can be raised with an annual rainfall of less than 15 inches and that in the northern sections of the continent the limit of agriculture is much farther away from the arid center of the Commonwealth and a greater rainfall is required to grow crops successfully. There is, however, no agriculture in the northern tropical region at the present time except in a narrow fringe of territory along the coast.

IRRIGATION—RIVERS—ARTESIAN WELLS.

The question of irrigation in Australia is of more than ordinary importance to American manufacturers of farm machinery. As a rule, where agriculture is carried on with the aid of irrigation more American implements are seen than is the case in nonirrigated districts. Generally speaking, irrigated sections have small farms devoted to mixed crops, orchards, vegetable growing, alfalfa, or similar crops, and in such farms American plows and other farm machines are used practically to the exclusion of all others.

The agricultural future of a large part of Australia is dependent on irrigation, since, as stated elsewhere in this report, more than one-third of the area of the country has a rainfall of less than 10 inches per annum. While the amount of land that can be turned to profitable use only by means of irrigation is far in excess of the quantity of water available for the purpose, much land has already been placed under irrigation and the opportunities for further enterprise along that line are very great.

In the northern lowlands of the State of Victoria there are not less than 325,000 acres irrigated by water derived from the headworks constructed on the Murray, Goulburn, and Loddon Rivers. Victoria, in addition, has spent $25,000,000 for the supply of water for domestic and stock use, providing for an area of land nearly 21,000 square miles in extent. This includes the strictly agricultural sections of the Wimmera and Mallee districts, where the land thus served covers an area of 12,000 square miles. There is another irrigation plant at Mildura, where five pumping stations on the Murray River raise 8,000,000 gallons of water per hour and, by means of 280 miles of channel, irrigate 45,000 acres.

IRRIGATION PROJECTS IN NEW SOUTH WALES.

In New South Wales the Murrumbidgee irrigation scheme is the principal project of this character. It ranks among the biggest irrigation undertakings in the world. Its main feature is a storage dam across the Murrumbidgee River to retain the flood waters. During the summer months these are released down the river, from which a vast network of irrigation channels are fed. The dam wall is of cyclopean masonry and concrete and, when complete, will be 240 feet high. The impounded water forms a lake covering 12,740 acres. The reservoir will have a capacity of 33,612 million cubic feet, which will be sufficient to irrigate more than 200,000 acres, besides making possible the development of 1,000,000 acres of dry land adjacent to the irrigated section. There are other irrigation settlements in New South Wales, at Hay and at Wentworth, where there are 20,000 acres of irrigated land. In a number of New South Wales rivers, such as the Murray, Darling, Lachland, Hunter, Macquarie, and others, smaller irrigation settlements have already been established. Other potential irrigation projects are already under investigation and study by Government experts.

MUNDARING WEIR IN WESTERN AUSTRALIA.

The Mundaring Weir in Western Australia, about 20 miles from Perth, was originally and chiefly intended to supply water to the famous gold fields of Coolgardie and Kalgoorlie. Its existence, however, has made possible the development of a vast agricultural section of that State by furnishing a continuous and sufficient supply of water throughout the year for farm and live-stock use. Since no rain worth mentioning falls for six or eight months, it would have been impossible to reclaim that land for agriculture without devising some means whereby positive and continuous water provision is assured. This weir has a capacity of 4,650 million gallons, and when full its waters cover 760 acres of ground. It is a concrete overflow weir 100 feet high and 350 feet long. The water stored is carried to the enormous distance of 350 miles, through a steel main 30 inches in diameter, with the aid of eight large pumping stations situated at intervals along the main. Numerous smaller pipes are fed by this main throughout its course, furnishing water to hundreds of farms.

POSSIBILITIES IN MURRAY-DARLING RIVER BASIN.

In other States of Australia there are also great possibilities for irrigation. The Murray River crosses South Australia for several hundred miles, and its banks afford favorable conditions for undertakings along irrigation and reclamation lines. It is generally believed in Australia that with the aid of irrigation and reclamation the banks of the Murray and its chief tributaries will eventually support a population of 5,000,000. It is hazardous at present to indicate the degree of correctness in this belief, yet when it is considered that the Murray and Darling Rivers, with their tributaries, have a basin comprising 414,253 square miles (nearly one-seventh of the entire continent), it appears quite reasonable to visualize a great future in connection with the irrigation possibilities that these rivers afford. The irrigable area in this basin in the States of New South Wales, Victoria, and South Australia is estimated at 50,000,000 acres.

The use of rotary arm sprinklers has become extremely popular in Australia in the growing of alfalfa, market-garden products, potatoes, and orchards, and there is an important demand for supplies.

WATER SUPPLIES FROM ARTESIAN WELLS.

Artesian water is a subject closely allied to irrigation and one of foremost importance in Australia, since artesian water, in many instances, has made possible the cultivation of lands that otherwise would have remained sterile and unproductive. There are sections of land in South Australia, Victoria, and New South Wales, covering many millions of acres, where the whole of the rainfall is concentrated in a few months of the year. Fortunately this period generally coincides with the growing season. On the other hand, the insufficient rainfall during the rest of the year fails even to provide for the necessities of the people on the farms and of their horses, sheep, and other stock. Without an artificial supply of water, therefore, it would be impossible for the farmers to remain on their farms throughout the year, as, of course, is necessary. Chiefly by means of artesian wells, adequate water supplies are obtainable. Many thousands of miles of pipes and drains radiate from the artesian bores. Most of these, especially the most important ones, are under the control of and operated by the Government, and carry the water to farms that are sometimes several hundred miles from the bore. In the State of Victoria there are 2,700 miles of water drains, which distribute nearly 40,000,000 gallons of water daily, supplying an area of nearly 4,500,000 acres.

In Australia as a whole there are no fewer than 3,470 artesian and subartesian bores, representing a total depth of 3,756,193 feet bored, with a total daily flow of more than 3,756 million gallons of water. The greatest depth from which artesian water is obtained is 5,045 feet, but there is a preponderance of wells from 1,000 to 2,000 feet in depth. Queensland has the largest number of artesian bores yielding water suitable for watering stock. This, at times, is not suitable for irrigation, owing to the presence of alkali. Queensland, South Australia, and New South Wales are within the great Australian artesian basin, and they are, consequently, best provided with artesian water supplies. Smaller artesian basins exist in the other States, but Western Australia in particular is poorly favored in this respect.

Attention has often been directed to the fact that there has been much trouble with the corrosion of the casing used in connection with artesian bores. American manufacturers of casing that has exceptional corrosion-resisting features should look into the matter and take steps to prove the suitability of their product under such conditions. There is a considerable demand in Australia for bore casing—a demand that undoubtedly deserves the attention of American manufacturers.

CHARACTERISTICS OF PRINCIPAL AUSTRALIAN RIVERS.

All rivers of Australia flow down from the dividing range to the sea. The Murray River, the largest in the continent, rises in the southeastern corner of New South Wales, and for 1,250 miles it forms the boundary between that State and Victoria. It then flows for 510 miles across South Australia. The Lachlan and the Murrumbidgee enter the Murray from the north, as does the Darling River.

The Murray and Darling Rivers, with the tributaries of the former, have a combined length of 3,282 miles. The dredging of the Murray, Darling, and Murrumbidgee and the construction of a system of locks have been contemplated for some time, and it is not improbable that this work will be commenced at an early date. This would conserve a considerable amount of water for irrigation purposes and would, in addition, furnish about 3,000 miles of navigable highways to the interior.

The Darling and Murray Rivers are already navigable in some seasons, for stern-wheel steamers of light draft, for a distance of about 2,300 miles. It is only in an exceptional year, however, that such a distance can be navigated, and the return trip can not often be made in the same season. More regular navigation, although not uninterrupted, occurs for a distance of 300 to 500 miles from the mouth of the Murray.

DROUGHTS.

The agricultural and pastoral prospects of Australia are subject to periodical checks as a result of droughts. The drought of 1914 was one of the most severe ever experienced in that country. Its effect upon agriculture will be readily understood when it is realized that less than 25,000,000 bushels of wheat were harvested from a sown area of 9,287,396 acres, giving an average yield of about 2½ bushels per acre. Wheat, and chaff for horses and live stock, had to be imported in large quantities, and as much as $75 per ton of chaff had to be paid by the farmers of certain sections. The effect of the drought upon the pastoral industry is indicated by the decrease in the number of sheep from 85,057,402 in 1913 to 69,705,748 in 1914–15.

The recuperative powers of Australia, however, are really surprising, and a few years of relatively fair seasons will enable the country to effect a complete recovery and to continue its progress. While the strong demand for wheat since the beginning of the war is largely responsible for it, it is nevertheless significant that in the season following the drought the acreage under wheat increased by nearly 3,000,000 acres. This is an exceptional occurrence, yet it is quite characteristic of the Australian farmers to show most commendable self-control in adverse seasons. Whereas in some other parts of the world despondency and discouragement would become manifest in a positive manner and be reflected in much curtailed operations for several subsequent seasons, the Australian farmer shows a persistence and determination, in the face of reverses, that speak most favorably of his value to the community and his capacity for success.

SOILS.

Running almost continuously around the Australian Continent there is a belt of rich alluvial soil of great fertility about 40 miles in width which, as a rule, has an adequate rainfall. Contiguous to this belt there is much land equally excellent though rather deficient in water. It is hoped, however, that much of this land will ultimately be improved, for several rivers traverse those districts and irrigation in many cases seems quite feasible.

Outside of the belt referred to the soils are rather light. The most common kind is sandy soil varying in degree of fertility from black sandy loam, including sandy clay, to very light sand. This is the outstanding character of the soils of the wheat-growing districts of Australia. In the "mallee" sections light chocolate and sandy soils predominate. They have proved well adapted for wheat growing when given an adequate admixture of phosphates. Deep sandy pockets, almost bottomless, are frequently encountered, however, in many farms of the "mallee." This is a matter of great significance in connection with the use of tractors. The existence of these sand pockets presents the only serious drawback to the extensive use of those machines. The system of extensive farming so largely practiced in Australia, the scarcity and expensiveness of labor, and the prevalent contour of the land are otherwise extremely favorable to the use of tractors. It appears that where these pockets of sand occur tractors running upon tracks will prove more satisfactory than round-wheel tractors.

Queensland and the northern districts of New South Wales have much the best soils in Australia, these being largely volcanic in character. In northern and eastern Queensland in particular the land, consisting of volcanic soil and vegetable mold, is intensely fertile. Along the margin and pockets of a great many rivers and creeks, in some cases extending over thousands of acres, the soil is composed of rich alluvial deposits. The Darling Downs, in southern Queensland, contain 4,000,000 acres of magnificent black soil, which is chiefly decomposed basalt. Along the Queensland coast there are also very rich lands suitable for sugar-cane growing, general agriculture, and fruit growing. In Tasmania red chocolate soils are rather prevalent. They are sticky and ordinarily wet, this fact often proving an impediment to the satisfactory operation of tillage implements.

While the sandy soils of the wheat-growing districts of Australia are, as a rule, deficient in one or more elements of plant food—particularly phosphoric acid and probably lime—they possess many compensating characteristics making for productivity. They are extremely friable, and the excellent climate and abundance of sunshine also add considerably to their usefulness.

In speculating on the effects of Australian soils upon the use of farm machinery, it must be remembered that, while the soil is not in itself hard to plow and cultivate, the fact that a great deal of cultivation is done in lands from which the stumps and surface roots have not been cleared makes it imperative that all implements should be heavily constructed.

USE OF FERTILIZERS.

The widely divergent character of the soils of the Commonwealth, their degeneration by repeated cropping, the restricted rainfall, and the difficulties attending the following of any desired order of crop rotation, have rendered it essential that considerable attention be given to artificial manuring. The introduction of the fertilizer grain drill, which Australia owes chiefly to America, has greatly facilitated the use of artificial manures, and much land that had formerly been regarded as useless has now been made productive by artificial fertilization. There is every reason to believe that the use of fertilizers will be even more strikingly characteristic of farming in the future; and while, aside from fertilizer drills, no machines are extensively used in that connection, Australia in time will doubtless prove a good market for the sale of manure and lime spreaders and distributors and other machines in that line.

Superphosphates have proved very suitable for the growing of wheat and other cereals in Australian soils. In 1914–15 Australia imported 235,000 tons of fertilizers at a cost of about $2,700,000, and a far greater amount of artificial fertilizers is produced in the country itself.

The fertilized area of New South Wales in 1914–15 was 2,329,819 acres, or about 48 per cent of the area under crop. Victoria had 3,728,279 acres, or 81 per cent of the cropped area; South Australia, 2,722,349 acres, or 83 per cent; Western Australia, 1,808,504, or 97 per cent; and Tasmania, 144,732 acres, or 52 per cent. A marked increase in the proportion of cropped land treated with manure is evident throughout Australia, as the following table indicates; the figures show the percentage that was manured of the total area under crops:

States.	1910-11	1914-15
	Per cent.	*Per cent.*
New South Wales	30	48
Victoria	69	81
South Australia	81	83
Western Australia	90	97
Tasmania	47	53

Under the conditions that obtain in the wheat areas of Australia at the present time, farmyard manure is practically neglected and regarded as of minor importance. The average wheat holding is so large, and the amount of stable manure produced in a year so small, that the effect of stable manure on the fertility of the farm is, for all practical purposes, inappreciable. This state of affairs, however, will not continue indefinitely. With a rapidly increasing population, and the inevitable increase in land values, individual holdings will gradually become smaller and farming more diversified. The raising of live stock will become more and more an important feature on the wheat farms, and ultimately the amount of farmyard manure produced on a farm will be sufficient to have a distinct effect upon its fertility. On dairy farms, as contrasted with wheat farms, farmyard manure is even now of great importance. The majority of such farms are situated in the moister districts where systematic rotation is possible. Moreover, the average dairy holding is considerably smaller than the average wheat farm and the number of live stock per unit of area is considerably larger. Farmyard manure, therefore, is certain to become an item of considerable economic importance. It will become of even greater importance in connection with small irrigated farms or orchards.

A feature of some interest in connection with wheat growing in Australia is the quantity of phosphoric acid removed from the Commonwealth with the wheat exported, and the necessity for returning this substance in some form to the soil. It is estimated that the wheat and its milled product exported from the Commonwealth during the past 10 years contained not less than 163,000,000 pounds of phosphoric acid.

There is little doubt that the increasing use of fertilizers throughout the Commonwealth, together with the greater attention devoted to fallowing and the combination of sheep farming with agriculture, is considerably improving the prospects of those dependent for a livelihood on the products of the soil.

COOPERATION AMONG FARMERS.

It is difficult to determine the exact extent and development of farmers' cooperation in Australia, since no records are kept of the movement as a whole. It is felt, however, that considerable progress is now being made in this direction and that associations of farmers are beginning to be factors of importance in the agricultural life of the country.

One of the largest farmers' cooperative societies in Australia is the South Australian Farmers Cooperative Union (Ltd.), of Adelaide, which has a turnover probably approaching that of any private firm in that State of the Commonwealth. This union maintains a farm-machinery department. It is expected that the development of farmers' cooperative societies will somewhat alter the existing status of the trade in farm machinery, for as these are formed they will probably make the sale of farm machinery one of their principal objects.

Cooperation among pastoral, dairying, and fruit farmers has made good progress in recent years. In the State of Victoria various dairy farmers' cooperative societies are united in two groups. These are known as the Gippsland and the Western Districts Associations. The first-named has disposed of $25,000,000 worth of produce during the past few years. In the past 10 years the Western Association has had a turnover of $35,000,000 and has paid bonuses and dividends aggregating $3,750,000.

AGRICULTURAL LABOR.

In the oldest-settled districts of Australia labor conditions and wages are, to a large extent, regulated by unions of agricultural workers. In other parts of the Commonwealth labor is not extensively organized, and, possibly on that account, conditions are much more satisfactory from the employer's standpoint. In any case, however, labor presents one of the greatest problems in the path of agricultural progress, for it is both scarce and expensive. In view of this, any machinery that will prove to save labor is certain to be looked upon with much favor by farmers. This fact is well reflected in the types and sizes of the machines most largely used.

The following rates and conditions were fixed a short time ago by the Australian Workers' Union for the Rural Workers' section thereof:

Hours.—Forty-eight hours to constitute a week's work; not more than 8 hours and 40 minutes to be worked in any one day and work to cease at noon on Saturday.

Overtime.—All work done in excess of 48 hours in any one week, including holidays, shall be paid at overtime rates equaling one and one-half times the ordinary rates and double time on Sundays.

Rates.—Reaper, thrasher, header, binder, stripper, and harvester drivers, 12s. ($2.92) a day. In cases where men work by the day, any portion of a day so worked shall be reckoned a full day.

Stack builders, hay and grain stackers and thatchers, 15s. ($3.65) a day and found.

Bag sewers, 10s. ($2.43) a day and found.

Sheaf pitchers, 10s. ($2.43) a day and found.

Plow and drill drivers, £2 ($9.73) a week and found.

General farm hands, 39s. ($9.48) a week and found. Day rates, with "tucker" (food), 8s. ($1.95) a day.

Grain stackers and carriers: Grain carriers, wheat lumpers, and stackers, £1 ($4.87) a day. Piecework rates, 6s. ($1.46) a 100, all around.

Chaff cutters: Engine drivers, 12s. 6d. ($3.04) a day; feeds, 12s. 6d. ($3.04) a day; bag sewers, 11s. ($2.68) a day; sheaf pitchers, 10s. ($2.43) a day; all other employees, 9s. ($2.19) a day.

Corn pulling, pressing hay and fodder, 11s. ($2.68) a day.

Millet cutting and thrashing, 11s. ($2.68) a day.

Thrashing grain: Sheaf pitchers, 10s. ($2.43) a day; all other employees, 9s. ($2.19) a day and found.

Potato diggers, 1s. ($0.24) a bag for two classes and 1s. 3d. ($0.30) a bag for three classes in crops yielding over 3 tons an acre, without keep (Chapman sack), or 10s. ($2.43) a day, or £2 10s. ($12.17) per week and found.

Cooks' rates: Cooking for 10 men or under, £3 ($14.60) a week, with 6s. ($1.46) a week a man extra for every additional man above 10. The employer shall provide the cook with tent, stove wood, and water and cooking utensils free of charge.

The enlistments for military service have constituted a drain upon the labor supply of Australia, especially as they have absorbed the better class of rural workers. This, in certain districts, has left the field clear for a less desirable type of worker.

Following is the official comparison of labor disturbances in Australia during the years 1915 and 1916:

Items.	1915	1916
Number of disputes	358	508
Establishments involved	942	1,536
Number of people involved directly and indirectly	81,292	170,683
Number of working days lost	583,225	1,678,930
Total estimated loss in wages	$1,458,720	$4,708,845

Unsatisfactory labor conditions have tended to retard agricultural development in many directions. Crops for which the country is most excellently suited, such as sugar, corn, cotton, rice, etc., are not produced, for this reason, in sufficient quantities to meet local requirements, and in some cases they are not produced at all.

CARE AND SHELTER OF MACHINERY.

Because most of the farm machinery is supplied directly to the farmers by the importers and manufacturers (who, as a rule, are located at the various port cities), and on account of the lack of implement dealers throughout the farming sections, the Australian farmers have been compelled to depend largely upon themselves in caring for their implements. All farms are usually equipped with a repair shop, and the farmers are ordinarily able to effect minor repairs in their machines. Many farmers are extremely careful to keep their equipment in good working condition and to protect it adequately when not in use, but there are also a number who fail to give their machines the attention they deserve. It may be said, however, that ordinarily the farmers take good care of their implements.

Throughout the country there are small implement factories that, in addition to supplying new machines, do also a great deal of overhauling and repair work. In the past, moreover, much of the implement business has been done on the basis of trading in old machines when new ones are purchased.

The high cost of building materials in the farming sections of Australia has militated against the general construction of barns and sheds to store the machinery in the off season. Consequently only such machines as are especially liable to damage are adequately stored. The heavier implements, in the construction of which little wood is used, such as plows, cultivators, harrows, etc., are not always stored. The substantial construction of these and the favorable climate prevent the damage that would otherwise be observed.

GOVERNMENT ENCOURAGEMENT AND ASSISTANCE.

It is generally admitted that those engaged in agricultural and pastoral pursuits directly and indirectly carry on their shoulders most of the burden of providing the public revenue of Australia and of making possible the existence of a large industrial population in the metropolitan centers, making good wages and enjoying comfortable conditions; and the Commonwealth and State governments have extended considerable assistance to the farming community, especially at the time farmers begin their operations and in cases of distress such as result from droughts and other causes. The conviction prevails in some quarters that at times a negative result has been achieved. Individual initiative and self-reliance, it is sometimes claimed, are impaired by the injudicious assistance given in some cases. The belief is expressed by some that too many of the cares and obligations that should have been left to the farmers have been assumed by the Government. This state of affairs is not general, but as a rule it prevails in the more recently developed sections of Australia. The industries assistance board, of Western Australia, for instance, generally supplies the settlers with anything necessary to keep them on their holdings. The policy of that board, to use the wording of an official report, is that "when a bona fide farmer desires to do so he should be enabled to remain on his land, and that the consideration of adequate security should not be a determining factor in granting credit," and further that "it was realized at the outset that losses in individual cases were unavoidable." The ulterior purposes of the Government are doubtless to be commended, but it is generally admitted that, because of a lack of adequate supervision, men have received assistance without possessing the requisite interest and qualifications for the proper cultivation of their land.

For the purpose of assisting settlers in the erection of buildings and the improvement of their holdings, systems have been established in all the Australian States under which financial aid is afforded to settlers by the state governments. The amounts advanced and the conditions regarding interest and repayment differ somewhat in the several States. Generally advances may be obtained on freehold property or conditional-purchase holdings for the purpose of paying off encumbrances, making improvements, developing the agricultural, pastoral, horticultural, and viticultural resources of the land, building homes on the land, and purchasing stock, machinery, or implements. Loans, together with interest at not more than 5 per cent, are generally repayable by half-yearly installments within 31 years. The various States up to the end of June, 1915, had advanced to farmers nearly $75,000,000, of which about $50,000,000 was outstanding at that time. Special clauses are inserted in many of the closer-settlement and small-holdings acts providing for advances to settlers. In the Northern Territory the Commonwealth has from time to time thrown open large areas for settlement, at the same time assisting settlers in the purchase of fencing, implements, stock, etc.

By taking advantage of the opportunities thus afforded for borrowing money at a low rate of interest, repayable in small installments, many farmers have been able to make their holdings productive at an early stage when otherwise they would have had a hard struggle to surmount the initial difficulties incident to the cultivation of virgin lands.

AGRICULTURAL COLLEGES AND EXPERIMENT FARMS.

Five agricultural colleges are at present in existence in the Commonwealth. These have been established to promote agriculture and to improve systems of stock breeding and dairying. Provision is made in these colleges, as also in several experiment farms, for the accommodation of pupils, to whom both practical and theoretical instruction is given by experts in various branches of agriculture. Analyses of soils and fertilizers are made, in addition to other work of a similar character. Experimental work is carried on with cereal and other crops, and a great deal of research work along many other lines is conducted. These institutions have proved powerful factors in making possible the development of agriculture in the more arid parts of the Commonwealth. In connection with the breeding of drought-resisting varieties of cereals, they are favorably known by similar agricultural institutions throughout the world. In 1914–15 748 students attended these colleges.

The colleges are situated at Hawkesbury (New South Wales), Dookie and Longerenong (Victoria), Roseworthy (South Australia), and Gatton (Queensland).

Experiment stations are maintained by the various States as follows: New South Wales, 18; Victoria, 5; Queensland, 6; South Australia, 6; Western Australia, 6; Tasmania, 1; and Northern Territory, 2.

GENERAL ASPECTS OF FARMING LIFE.

Agriculture in Australia has attained a degree of permanency that in some cases is astonishing, for farming has often been undertaken in districts where conditions were seemingly unfavorable even for settlers of the most enterprising character. All difficulties, however, have gradually been conquered. As a result of the efforts, resourcefulness, and enterprise of the pioneering farmers there has developed in Australia a farming population possessing in a high degree the qualities of determination, ambition, capacity for hard work, and ability to surmount all obstacles encountered.

It is not uncommon to find farmers who almost single-handed, with perhaps only the casual help of a son or brother, cultivate wheat farms of 800 to 1,000 acres, equally divided in crop, fallow, and pasture land. It will be apparent that a farmer must be exceptionally capable and industrious to perform all the work connected with a farm of this description, yet in the chief wheat-growing districts men operating on this basis are fairly numerous.

It is quite generally recognized that the rapid progress of the industrial population of Australia in the improvement of its condition have not been made without jeopardizing the position of the farmers. The high cost of all manufactured articles has been a severe burden to the farmers and has necessitated increasing labor and effort on their part, while it has also reduced the just returns to which their labor and enterprise have entitled them.

The business aspects of farming operations have often been lost sight of by the farmers. This fact is characteristically reflected in the long terms of payment (generally conceded to be unnecessary) on which they buy their farm machinery and other supplies. While liberal terms of payment are required in the case of new farmers, in the older farming districts these are often unnecessarily insisted upon. It is obvious that the cost of carrying extended accounts must fall directly or indirectly upon the purchasers.

Reliability and hospitality are inherent attributes of the majority of Australian farmers. They are most exact in the observance of the obligations that they incur in the course of trade. The wholeheartedness and sincerity with which they offer their hospitality is proverbial, and one can not fail to find much pleasure in social intercourse with them.

In the older farming districts farmers live in a relatively good degree of comfort. They keep pleasant homes, surrounded by every reasonable convenience. The homes of the sheep "stations," as sheep ranches are called in Australia, are famous for the high degree of comfort and even luxury enjoyed by their owners. In the newer agricultural sections life is much more frugal, and until the farmers have overcome the difficulties of gaining a living under rather unpromising circumstances they do not provide themselves with what to many would be necessary conveniences of life.

IV. AUSTRALIAN CROPS AND PRODUCE.

WHEAT.

The enormous importance of the Commonwealth's wheat industry becomes readily apparent when one considers that 82 per cent of all cultivated land is under wheat for grain or wheat to be cut for hay. Of the total area under cultivation in 1915–16, 64 per cent, or 12,530,233 acres, was under wheat for grain, and 18 per cent, or 3,530,111 acres, under wheat for hay. In the States of South Australia and Western Australia, however, the proportion cropped with wheat is much greater, being 94 and 96 per cent, respectively.

The reason why such a large proportion of the cultivated area of Australia is under wheat is that the land lends itself admirably, and in certain vast sections almost exclusively, to wheat growing and to the extensive method of farming common to all comparatively new countries, where the land is cheap and the individual holdings large. With the use of multiple-furrow plows, 20-tooth cultivators, and 4-horse drills, large areas can be put under wheat in Australia with a minimum of hand labor, and the stripper harvester enables such large areas of grain to be reaped with the utmost facility. With an increase of population and the inevitable higher value of the farms, this system of farming, particularly in the States of Victoria and New South Wales (where the rainfall is relatively abundant), will gradually become modified, and smaller wheat farms, better cultivated and yielding higher averages per acre, will be the aim of the farmers.

ECONOMIC IMPORTANCE OF INDUSTRY.

The wheat used for human consumption in Australia during the past 10 years has averaged 25,000,000 bushels per annum. The quantity annually used for seeding purposes is approximately 8,000,000 bushels. During the five years ended June 30, 1914, Australia exported an average of 43,000,000 bushels of wheat yearly. The United Kingdom takes about 70 per cent of these exports. South Africa and France are also regular buyers of Australian wheat.

In 1915–16, when a record wheat harvest yielded 179,622,220 bushels, Australia was excelled only by the United States, Russia, France, and India as a wheat-producing country. The 1916–17 harvest yielded 150,799,965 bushels. Notwithstanding the difficulties of obtaining shipping, wheat valued at nearly $40,000,000 was exported in 1915–16.

FUTURE OF WHEAT GROWING.

The success attained in stock raising and dairying in the better-watered regions of Australia indicates that the future of the Australian wheat industry is largely dependent on the profitable utilization of those vast areas that are now considered outside the margin of safe farming. From the remarkable developments and experiences of the last decade in the profitable opening up of lands hitherto considered practically useless, it is apparent that no one can safely predict the possible confines of profitable wheat farming in the future. To extend further the zone of wheat cultivation, however, it is evident that attention must be concentrated on those factors that will enable the grower of the future to raise wheat successfully in the more arid portions of Australia. In any event, wheat is undoubtedly destined to remain, for many years to come, the chief staple crop of the Commonwealth and its most important economic asset.

CLEARING THE LAND—PREPARATION OF SEED BED.

Much of the land where wheat and other small cereals are cultivated was originally well timbered, or covered with heavy scrub. The need confronting the new settlers for prompt cash returns, on the one hand, and the scarcity and high cost of labor, on the other, made it unprofitable and in their opinion not altogether necessary to clear the land of its stumps and surface roots when it was prepared for cultivation.

The States of Victoria, South Australia, and Western Australia had and still have large areas covered with "mallee" scrub—a thickly clustered eucalyptus about 15 feet high with characteristically swollen root stocks. Such land has invariably proved most suitable for wheat growing. This "mallee" scrub has been pulled down, either by means of chains dragged by oxen or by rollers, often consisting of heavy tree trunks, hitched onto traction engines. Some time after this scrub is pulled or rolled down it becomes sufficiently dry so that it can be easily burned off. When this has been done, without taking the roots or stumps off the ground, the land is prepared for wheat cultivation with the use of stump-jump plows or other stump-jump implements. The first time such lands are cropped they receive a very indifferent kind of cultivation and are seldom plowed deeper than 3 inches. In some cases only a stump-jump disk cultivator is passed over the land to prepare it for seeding. This is done because such "mallee" lands are generally brought under cultivation by new farmers who have only a rather small capital at their disposal at the beginning of their operations and who, besides, needing immediate returns, can not afford at that time the more careful and expensive system of cultivation that is given to wheat-growing lands by the better-established farmers. The stumps and roots in such mallee districts, however, are seldom cleared off the land, even after the farmers become better able to do so. As cultivation proceeds, in the ensuing years, these stumps become loose, and they are then taken off the land by merely picking them up. In the course of time, therefore, without any particular effort by the farmer, the farms ultimately become free of them.

In other parts of Australia, where the natural vegetation of the land consists of heavier forest, the large trees are ringbarked—that is, a ring is cut around the tree's bark, a few inches from the ground, penetrating somewhat into the body of the tree itself. Several months after this has been done, when the trees are dead and have become an inert, dry mass, their top weight causes them to break where the ring was cut and fall to the ground without any further attention on the part of the farmer. The fallen trees and all the ground scrub are then burned off. When such lands are utilized for the growing of cereals they are not cleared of the stumps and surface roots and, in this case again, stump-jump implements become a necessity. In burning off heavily timbered land special care is taken to have the fire penetrate as deeply as possible into the portion of the stump below the surface of the land. Even then, however, for a large number of years the stumps remain an obstruction precluding the use of implements other than those of the stump-jump variety. The continuous working of farm machinery upon the stumps and their natural decay cause them eventually to cease to stand in the way, and the land can then be cultivated with machinery such as American manufacturers can regularly furnish.

The preceding remarks explain the necessity and the extensive demand in Australia for stump-jump plows and other implements provided with that feature, as also the necessity for very heavily built machines for the other operations connected with wheat growing, such as drills, binders, harvesters, etc., since the presence of stumps on the land subjects the machines to severe jolts and shocks that cause them to deteriorate rapidly unless they are strongly constructed.

SEEDING.

Owing to the character and peculiarities of the climate, the uncertainty of the spring or early summer rains, and the long, hot, and relatively dry summers, characteristic of most of the wheat-growing areas of Australia, spring sowing is far from being a success in those districts. Autumn or early winter sowing is regarded as essential to success over the greater part of Australia. Generally speaking, the latter part of April and the month of May are the most favorable periods for sowing in the drier areas, while seeding may often be prolonged until June in other districts. Where large areas are to be sown a start must be made as early as possible, in order to finish the seeding within a reasonable length of time. It must be understood at the outset that most of the wheat is sown on well-prepared bare fallow.

Fertilizer grain drills are used almost universally in Australia to sow wheat. For many years American manufacturers of drills supplied the majority of those used in that country. Subsequently they had to give way to the local manufacturers, and the latter are now supplying most of the drills required. In most cases Australian manufacturers have copied American machines very freely. Their close contact with local conditions, however, has enabled them to add certain features and refinements to their product that have further assisted them in securing the patronage of the Australian farmers. No small influence has been exerted by the application of a duty of 25 per cent ad valorem on imported drills.

The average amount of seed used when wheat is sown for grain is from 45 to 60 pounds per acre, while for hay and forage from 1 to 2 bushels of seed may be used. In sowing wheat for grain, however, the amount of seed per acre may vary from as low as 30 pounds in the dry "mallee" districts to 70 pounds in the more moist localities. Generally speaking, the rule is to sow early crops thin and late crops thick, and to sow light land thicker than rich heavy land.

The chief varieties of wheat grown in Australia are Bayah, Bunyip, Dart's Imperial, Federation, Gluyas, King's Early, Steinwedel, Marshall's No. 3, and Yandilla King. The principal requisites in seed wheat for Australian conditions are drought resistance, nonshattering of the grain, rust resistance, early maturity, and ability to thrive in relatively poor soils.

Considerable care is generally exercised in grading and selecting good wheat seed for sowing purposes, as well as in pickling it to avoid smut or bunt—this being considered a part of the regular farm routine. Bluestone is the most popular fungicide used for the purpose, 1½ pounds being dissolved in 10 gallons of water. Formalin also is often used. A number of machines for pickling seed wheat have become quite popular, but the pouring of the solution over several bags of wheat on a cement floor, and the shoveling over of the whole mass until every grain has been thoroughly wetted, is at present the most common method.

Several patented pickling machines are made in Australia that enable the grain to be very conveniently and expeditiously handled and much drudgery avoided. An effective type of pickling apparatus consists of a large wooden cask to hold the bluestone or formalin solution and a steel upright to which a pulley is attached. The seed is placed in a perforated copper vessel, fitted with a false bottom, held by a spring. The copper vessel filled with seed is lowered into the cask by means of the pulley and kept immersed in the solution for a certain specified time. It is then raised and the solution allowed to drain, through the perforations, back into the cask. The copper vessel is then swung around, over an open bag attached on a frame to the side of the cask; the spring holding the false bottom is released and the grain drops into the bag. The false bottom is then restored and the copper vessel is again charged with seed.

FERTILIZATION.

In Australia, assuming the rainfall to be sufficient, the limiting factor in crop production is the amount of available phosphoric acid in the soil, one striking peculiarity of Australian soils being their uniformly low phosphatic content. In many of the wheat areas of Australia the use of soluble phosphates is absolutely necessary to secure a crop.

Superphosphate is undoubtedly the most popular artificial manure. There are few soils in the wheat areas proper that will not favorably and profitably respond to applications of superphosphates.

Opinions differ very widely as to the adequate quantity of manure required per acre. Many farmers apply as little as 30 to 40 pounds per acre, whereas there are many who use from 100 to 200 pounds per acre. In regions of light rainfall the dressings are generally reduced to a minimum, while in the moister districts much larger quantities are used. In the majority of cases the best results are obtained with superphosphates when the seed and manure are drilled in together with fertilizer drills, but some farmers sow the manure some weeks before seeding, using either a cultivator with a drill attachment or the ordinary fertilizer drill. The former method is by far the more widely followed.

FALLOWING AND ROTATIONS—GENERAL CULTIVATION.

The nature of the Australian climate is such as to make thorough soil tillage a prime requirement in the successful growing of wheat, chiefly because the wheat-producing areas of the Commonwealth are generally situated in districts having a small annual rainfall. To make the fullest use of these areas, systems of cultivation must be practiced aiming at the conservation of soil moisture and of fertility. Fallowing, therefore, is largely practiced in those districts. Bare fallowing is the most popular method of preparing land for wheat in all but the most humid parts of Australia. At the present time approximately 60 per cent of the seed is planted in bare fallowing, and in the States of South Australia and Western Australia the percentage probably exceeds 75.

In many sections of Australia a three-year rotation is practiced in connection with wheat growing. The rotation system most in vogue is that of wheat, pasture, and bare fallow. This method enables the farmer to reap but one wheat crop every three years from a given piece of land.

With this object in view, the farms, as a rule, are partitioned in three plots. One of these is devoted to cropping, another to pasture for sheep and lambs, and the other, for a portion of the year at least, is kept under bare fallow. Another system of rotation is to sow wheat in well-prepared bare fallow and, after the wheat is harvested, to run the disk harrow over it and to sow oats afterwards with the object of utilizing the green crop as pasture. After the oats have been fed down, the land is further depastured for sheep and lambs and the rotation brought to a close by a season of bare fallow. From time to time, in certain localities, forage crops, such as peas, rape, rye, vetches, and barley, are grown in more or less regular rotation with wheat and bare fallow. The satisfactory results obtained from such a system of rotation, even in some of the drier areas, render it extremely probable that these crops will play an important part in the future of wheat growing, more especially when the lamb industry becomes better established.

One of the most striking features of Australian farming, and particularly of wheat growing, is the amount of work that the farmers do upon their fields to counteract the limitations of the rainfall. Cultivation, therefore, is carried on most extensively and thoroughly, so much so that it is doubtful whether the farmers of any other country, cultivating comparatively large blocks of land, could show so much activity in this direction. The selection of cultivating implements is a matter to which farmers attach great importance. Any new machine for that class of work having any special advantage is certain to receive the quick recognition of the farmers and to become in great demand. Spring-tooth cultivators and disk harrows are the machines chiefly used to keep the land in good tilth. The Australians have evolved a cultivating implement known as the disk cultivator, often constructed with the stump-jump feature, which is also extensively used in fallowing and other tillage work. Spike-tooth harrows, of course, are also largely used. Disk harrowing of the land, before plowing, is being done to an increasing extent, and as soon after the harvest as possible.

Packing the soil with rollers is the regular practice in many wheat-growing districts. Most of the implements for this work are home-made, the farmers using a well-rounded and symmetrical tree log, 10 or 12 feet long, for the purpose. Rolling the crop after it has grown some 6 inches is frequently practiced, especially when it is intended to cut the crop for hay or ensilage, as this helps to make a level surface for the binder, thus facilitating the harvesting of the crop. Moreover, on light, open land the consolidation of the soil effected by rolling is very beneficial to the growing crop. On heavy lands that tend to set hard and that are likely to run together with the winter rains, the harrow is often used instead of the roller.

HARVESTING.

The enormous increase in wheat growing in Australia would hardly have been possible had not suitable machinery been evolved capable of satisfactorily handling the matured crop under the climatic and labor conditions prevailing in that country. The entire credit for the development and perfection of the stripper and, later on, of the stripper harvester is due to the Australians themselves, as both of these machines were invented and first perfected and built in that country. When it is considered that these machines as built at present are but little different from the first ones built, and that under ordinary conditions they work in a most excellent manner, it must be admitted that Australian agricultural engineers are second to none when given an equal opportunity.

Labor and climatic conditions, to about an equal extent, are responsible for the use of the types of harvesting machines in vogue in Australia. Owing to the dry atmosphere prevailing in the wheat areas during harvest time, as soon as the wheat has matured the heads quickly become intensely dry—so much so that a great deal of the grain would undoubtedly be lost if the harvesting methods of moister climates were adopted. It is important that the ripened wheat should be handled as little as possible so as to prevent the grain from shattering off to the ground. For this reason machines of the stripper type are a necessity under Australian conditions, for these enable the farmer to strip, or cut, the heads of wheat from the standing crop in such a manner that they are immediately thrashed and separated in one operation, or are thrashed and so collected in a box (built on the machine) as to avoid any loss of grain in the further preparation of the wheat for market.

Farm labor is expensive, difficult to get, and generally unsatisfactory in quality. The aim of the farmer, therefore, must be to become altogether independent of hired labor if this is at all possible. The harvesting methods prevailing in Australia ordinarily enable the landowner to attain this goal. With the stripper harvester the farmer himself can, if necessary, do satisfactorily all the work connected with the harvesting of his wheat crop.

Plain strippers are still used in the newly settled areas of the Commonwealth, for the chief reason that they are less costly than the stripper harvesters and enable the farmer who is struggling to subdue a rough piece of land with restricted means to save the best part of the chaff, which can be profitably utilized to feed his horses.

These machines strip the heads off the standing crop and thrash them, depositing the mixed, unseparated wheat and chaff in a box. When this box is full, the machine is taken to the place where the separation is to be made and there the box is emptied. There is some delay in handling a crop so harvested, and the use of the winnower, furthermore, makes it necessary for the farmer to employ outside help. The aim of the farmer, therefore, is to discontinue the use of the plain stripper as soon as he is financially able to do so.

The stripper harvester makes any delay unnecessary and enables one man to harvest a crop, if he desires. As is the case with the plain stripper, it strips the wheat heads and thrashes them, and in addition it separates the chaff from the wheat, the clean grain going into a large box, which holds four or five bags of wheat. No straw or chaff is saved in using the stripper harvester. When the grain box is full, the machine is stopped and the wheat bagged, two bagging attachments being usually provided, and the farmer can, without any help, empty the contents of the box into the bags in the course of a few minutes. With the use of the stripper harvester, wheat that was standing in the field in the morning may often be in course of transportation to the flour mills in the evening.

About five years ago a Canadian "reaper-thrasher" was introduced in Australia, and an American manufacturer of harvesting machinery introduced a similar machine two years later. The reaper-thrasher combines some features of the stripper harvester and some of the reaper. Its name is quite appropriate, although this is said to have been originally adopted with a view to having the machine passed by the customs either as a reaper or as a thrasher. The duty on reapers is 5 per cent and on thrashers 10 per cent, whereas a complete stripper harvester, in which class the reaper-thrasher is now included, is charged a duty of $70.

The most distinctive feature of the reaper-thrasher is that it has a knife constructed along the lines of those used in mowers and binders. One of the machines has fingers or guards like those machines, whereas the other adheres to the use of a comb similar to that used on strippers. In the reaper-thrasher the stalks are drawn through the comb or guards until the heads, assisted by a reel that travels at about the speed of the machine, are pushed forward and come in contact with the knife. The heads are thus cut off by the knife before the crop can pull heavily upon the comb—this fact greatly reducing the draft and preventing rotten crop from being pulled by the roots, as is likely to happen when the stripper is used. In the case of a crop badly knocked down, the reaper-thrasher can be lowered to get closer to the crop, and if this is weedy it prevents the green weeds from attaching themselves to the comb and choking the machine up. The stripper is constructed chiefly to strip or cut off brittle matter, such as dry matured wheat, and for this reason the reaper-thrasher is preferred by the farmers, since it can be used not only under those conditions but also when crops are knocked down, rotten on the roots, or weedy.

WHEAT YIELDS.

There is considerable variation from year to year in the average Australian wheat yields, as a result of the vagaries of the season and, particularly, the rainfall obtained.

The average wheat yield per acre for the entire Commonwealth during the 10 seasons ended 1914–15 was 10.22 bushels. During this period the yield was only 2.58 bushels per acre in the season of 1914–15, whereas 12.90 bushels per acre were harvested in the season 1910–11. In 1913–14 there was an average yield of 11.13 bushels per acre and a total yield of 103,344,132 bushels. The season of 1915–16 was extremely favorable, the average yield being 14.34 bushels per acre, establishing a record average yield as well as a record harvest of 179,622,220 bushels. This record harvest, coming after the almost complete failure of the crop in 1914–15, when only 24,892,402 bushels of wheat were harvested, was extremely welcome.

When this harvest was brought to market the approximate price for wheat was $1 per bushel, which indicates the wealth which that harvest brought to Australia.

The heaviest wheat yields are obtained in Tasmania and Queensland, which are the two most unimportant wheat-growing States of the Commonwealth from an acreage standpoint. The average yields there for a 10-year period are 20.46 and 11.78 bushels per acre, respectively. The lowest yields are reported from Western Australia and South Australia, with 9.43 and 8.69 bushels, respectively.

Generally speaking, Australian wheat is a grain of bright, clear texture, rich in gluten and of fine milling quality. Its excellence is attested by the high price it brings in the markets of the United Kingdom, this being at least as high as that of the wheat exported there from any other part of the world.

METHODS OF WHEAT HANDLING.

The question of handling the wheat in bulk by means of elevators, instead of putting it in bags of 180 pounds, as has been the practice heretofore, has received considerable attention throughout the wheat-growing districts of Australia during the past few years, particularly in New South Wales, Victoria, and South Australia. As a matter of fact the legislature of the State of New South Wales voted in favor of the proposition, and the Government immediately asked for tenders for the construction of the elevators and for the acquisition of other material required in that connection. The expenditure to carry out this undertaking is estimated at from $10,000,000 to $15,000,000. It is assumed that, by the time this report is published, this work will already be under way. Legislation has been under consideration also by the States of Victoria and South Australia to provide for the construction, under Government control, of elevators to make possible the bulk handling of grain; but, owing to the war, with the resulting high cost of imported materials and of freights, and in view of the fact that it seems advisable to watch how successfully the New South Wales scheme turns out, it has been decided to postpone definite action for the time being. It is almost certain, however, that shortly after the war most of the wheat produced in Australia will be handled in bulk. This will open up an extensive demand for the sale of portable grain elevators, gas engines, and other machines required when wheat is handled in bulk and by elevators.

WAR CONTROL OF WHEAT BY THE GOVERNMENT.

Owing to the abnormal conditions brought about by the war, a wheat-marketing scheme was entered into by the States of New South Wales, Victoria, South Australia, and Western Australia for the purpose of realizing to the best advantage the wheat harvest of the States named, and of making advances to farmers pending the sale. The general principles of the scheme were that all growers should participate equitably in the realization of the harvest and the proceeds thereof, and that the limited freight space available should be allotted between the States in accordance with the exportable surplus of each State. Banking arrangements were made to meet advances to wheat growers, until definite settlement for the sales made was effected. Up to the end of June, 1916, 161,280,000 bushels of wheat had been delivered by farmers under this scheme. The British Government, in the latter part of 1916, purchased the whole of the remainder then on hand in Australia from the 1915–16 wheat crop, and the entire crop of 1916–17, less local requirements, at 4s. 9d. ($1.16); this involved a sum of about $130,000,000. There is no doubt that these arrangements, on the whole, have proved most beneficial to Australian wheat growers, since Australia has been more handicapped than any other country by the scarcity of shipping facilities throughout the world during the past three years.

HAY.

Next in importance to wheat, hay figures as one of the leading crops of Australia. During the five seasons ended 1914–15, about 20 per cent of the total area under cultivation in the Commonwealth was devoted to hay. In most European countries the hay crop consists entirely of meadow and other grasses, whereas in Australia a very large proportion of the area under hay comprises cereal crops, mainly wheat and oats. A considerable quantity of alfalfa hay is also made, particularly in New South Wales and Queensland.

Considerable fluctuations occur in the area devoted to the hay crop, chiefly as a result of the variations in the relative prices of grain and hay and the prospective character of the grain crop. Crops originally sown for grain are frequently cut for hay because of the improved prices of that commodity or the fact that the outlook for the development of the grain is not a satisfactory one. On the other hand, improved grain prices, or the prospects of a heavy yield, will frequently cause crops originally intended for hay to be left to mature for grain.

The kinds of hay raised and the acreages in 1914–15 were as follows:

States.	Total.	Wheat.	Oats.	Barley.	Alfalfa.	Other.
New South Wales	783,107	568,982	158,949	1,179	52,570	1,427
Victoria	895,755	192,562	677,895			25,298
Queensland	79,327	14,906	12,573		47,785	4,063
South Australia	445,832	318,586	118,505		3,976	4,765
Western Australia	332,037	266,113	64,037		328	1,559
Total	2,536,058	1,361,149	1,031,959	1,179	104,659	37,112

The area under hay in Tasmania in 1914–15 was 89,598 acres, in the Northern Territory 2,837 acres, and in the Federal Territory 120 acres.

It is almost the universal rule for a farmer to cut about 25 per cent of his wheat land for hay, this forming the staple food ration of his horses. Wheaten hay is cut before the head begins to harden or, in other words, when the sap is distributed throughout the stalk and head. The crop at that time still has a greenish color, beginning to turn yellow. The chief aim is to produce fresh and succulent feed. Owing to the demand for hay in the large cities the farmers situated near them almost invariably cut their entire wheat crop for hay. In such cases the hay is at once carried to the large chaff mills in enormous wagon loads, often containing 8 or 10 tons of hay. The individual farmers who cut only enough hay for their own requirements stack the hay and cut it for chaff, with chaff cutters, when required. All hay is reaped with binders, and American machines are largely used for this work.

Among the most popular varieties of wheat grown for hay in Australia are the following: Barrota Wonder, Correll's No. 7, Firbank Huguenot, Majestic, Marshall's No. 3, Thew, Triumph, White Tuscan, and Zealand. In cultivating wheat for hay, varieties of seed are selected that produce an abundance of straw and are sweet and palatable to stock. They are also fairly solid in the straw and preferably beardless.

The average yield of hay for a 10-year period is 1.19 tons per acre for the entire Commonwealth.

OATS.

Oats come next in importance to wheat among the grain crops of Australia, although oats ordinarily contribute less than 5 per cent to the total area under crop. The principal oat-producing districts are in Victoria, which, for several years, has produced about 55 per cent of all the oats grown in the Commonwealth. The average yields for 10 seasons are given as 18.19 bushels per acre. Tasmania averages 30 bushels, New South Wales and Victoria 19 bushels, while South Australia shows the lowest yield, with 11½ bushels per acre.

The production of oats has not yet reached such a stage as to permit of an export trade. In fact, in certain seasons the imports have exceeded the exports. There has been a notable increase in the acreage under this crop in recent years, this being at present about twice as large as in 1905. About 800,000 acres are at present devoted to oat growing.

The oat harvest of 1915–16 was a record one, yielding 16,602,846 bushels, giving a return of 22.91 bushels per acre.

Oats are planted between March and May and harvested at about Christmas time. The methods of preparing the land for this crop, as well as of seeding, harvesting, etc., are, as a rule, like those described in detail in connection with Australia's wheat crop.

BARLEY.

A large acreage of barley is cropped to be cut as green forage, smaller areas are planted for hay, and not infrequently crops originally sown for grain, when they promise poor results, are either fed off by the cattle or cut for hay.

Victoria and South Australia produce about 80 per cent of the barley of the Commonwealth. The acreage devoted to this crop fluctuates very considerably, although a tendency toward increasing it has been observed during the past few years. The acreage in 1914–15 was 153,656, against 117,442 in 1890–91. About two-thirds of the area under barley is malting barley.

The average yield for 10 seasons was 17.82 bushels. The present production is about sufficient to provide for the requirements of the Commonwealth, but in the past three seasons barley has been imported at the rate of 250,000 bushels per annum, in addition to about $150,000 worth of malt per annum.

OTHER GRAIN CROPS.

Other than the grain crops separately reviewed, the only grain and pulse crops grown in the Commonwealth are beans, peas, rye, and a small area of rice that has for some years been cultivated in Queensland and the Northern Territory. Should rice growing ever be seriously taken up in Australia, it is probable that large tracts of land in the northern part of the continent will be found well suited to its cultivation.

CORN.

New South Wales and Queensland are the only two States of the Commonwealth in which corn is at all an important crop. They have 143,663 and 176,372 acres, respectively, under this crop, out of a total of 339,781 acres for the entire country. In other words, about 95 per cent of all the corn of Australia is produced in the two States named. Next in importance is the State of Victoria, with 19,433 acres. None of the three remaining States of the Commonwealth has more than 200 acres under corn. In all the States, however, a certain amount of corn is grown as green forage and for ensilage, in connection with the dairying industry.

No increase in the cultivation of corn has been observed for several years. The acreage under this crop, if anything, is less than that of several years ago. In 1900, 1910, and 1911 the acreage was larger than in 1914–15. The difference is so small, however, that it may be said that the importance of the crop has remained stationary since 1895.

It is very difficult to account for the fact that corn has thus far received so little attention from the farmers of Australia, for in the States of New South Wales, Queensland, and Victoria climatic conditions, soil, and rainfall are favorable for the successful cultivation of this grain. Labor conditions are doubtless largely responsible for the relatively small importance of the corn crop. It is felt, however, that the unfamiliarity of the farmers with the excellent use that can be made of corn in connection with stockraising and dairying is the chief reason for the scant attention given by Australian farmers to the king of American cereals.

Corn is not extensively cultivated by any Australian farmer; in most cases it is a secondary crop. As a rule, therefore, small machines (that is, single-row planters and one-horse cultivators) are used, although of late years larger planters and cultivators have been sold in increasing numbers.

The average yield for 10 seasons, for the entire Commonwealth, was 27.91 bushels per acre. The heaviest yields were obtained in Victoria and New South Wales, with 48.89 and 29.84 bushels, respectively. The extraordinarily large yields obtained in Victoria are due, in great measure, to the fact that the areas under maize are comparatively small and that the districts where this crop is grown are peculiarly well suited to it. In Queensland the average is 23.16 bushels. In the other States, and in the Northern Territory, the yield ranges from 12 to 14 bushels.

Australia imports a certain amount of corn every year. For the three years ended June, 1915, about 900,000 bushels of corn were imported annually.

SUGAR.

The sugar industry of the commonwealth has been in a rather unsatisfactory condition since the elimination of colored labor; and while the Government, by means of bounties, the tariff, and other assistance, has even made possible an increase in the sugar output of the Commonwealth, the people of Australia are doubtless heavily taxed as a consequence of the determination to produce sugar (a crop so largely the product of countries in which cheap labor abounds) upon an expensive white-labor basis.

Bounties or similar aids to sugar growers have been given by the Government to assist in the development of the industry and to diminish the employment of colored labor in connection with it. As the industry has progressed the necessity for these bounties has diminished, and in 1913–14 only $726,296 was paid for bounties as compared with $3,069,603 in 1910–11. In 1902–3, 67,107 tons of sugar were produced with colored labor against 31,688 tons produced with white labor, whereas in the year 1913–14, 215,677 tons were produced with white labor and only 8,814 tons with colored labor. In 1912 the sugar industry employed 27,380 white and 1,383 colored persons.

Sugar cane for sugar-making purposes is grown only in the States of Queensland and New South Wales, and much more extensively in the former than in the latter. Ninety-three per cent of all the sugar cane produced in 1914–15 was grown in Queensland. As a matter of fact, sugar-cane growing in New South Wales is declining. In 1895–96, 32,927 acres were devoted to the crop in that State, whereas in 1914–15 only 11,421 acres were planted. There seems to be a strong inclination in New South Wales to devote the land where sugar cane has been cultivated for many years to the more profitable dairy industry. In Queensland, on the other hand, a substantial increase in the sugar-cane acreage is noted from year to year. In 1895–96, 77,247 acres were under sugar cane in Queensland; in 1905 this had increased to 134,107 acres and in 1914–15 to 161,195 acres.

Notwithstanding the increase in the area devoted to sugar cultivation, the Commonwealth has been importing in recent years comparatively large quantities of sugar, averaging over 50,000 tons per annum during the five years ended 1913. The season of 1914–15 shows, however, that 137 tons of Australian-grown sugar were exported.

The consumption of sugar in the Commonwealth is estimated at 235,000 tons per annum, whereas the average sugar output for the past five years has been about 185,000 tons per annum. Careful investigations conducted at the direction of the British Government to ascertain the possible sugar production in the various parts of the British Empire where sugar-cane is grown elicited the conclusion that Queensland possesses every advantage for the production of sugar at the rate of at least 500,000 tons per annum.

EFFECT OF LABOR CONDITIONS.

With labor conditions in the sugar-growing districts as they have prevailed for many years, it is almost impossible to conceive that the country, in spite of its favorable soil and climatic conditions and the apparently large areas of land suitable for sugar-cane cultivation, will ever be able to create an important export market for that commodity. For the past two years conditions have deteriorated rather than improved. What is known as the Dickson Award, made by the Industrial Court of Queensland, has raised so materially the wages of the labor employed by the sugar industry, and otherwise increased the expenses connected with the employment of labor, that the growers claim that if that award is to stand the industry will receive a severe check. At a meeting of the Australian Sugar Producers' Association one grower stated that the labor cost, on the pre-award basis of $12.50, has been increased to from $45 to $50.

AID EXTENDED BY GOVERNMENT.

Under the war precautions act, the price of sugar has for some time been fixed by the Commonwealth Government, and these prices control those paid to growers for their cane. Some time ago the Government was approached with a view to having the price of sugar raised so that the growers might in turn obtain a better price for their cane, this action being considered necessary in order to meet the higher cost of production. At the time this matter came up, the Government had for some time been buying the entire output of raw sugar at $60 per ton and reselling refined sugar at $145 per ton, which netted the Government a profit of about $2,500,000 per annum. In view of the pressing need to do something to assist the growers, it was decided that the Government should turn over to them the profit it had been making in connection with the sale and control of sugar. This arrangement is to continue until the end of the war and for the season following.

It appears to be the intention of the Commonwealth Government eventually to nationalize the sugar industry, and it is said that for some time past technical information has been collected with that object in view.

SOIL AND CLIMATE—METHODS OF CULTIVATION.

The soils of Queensland are mostly red volcanic, although black alluvial lands are predominant near the banks of the rivers. The

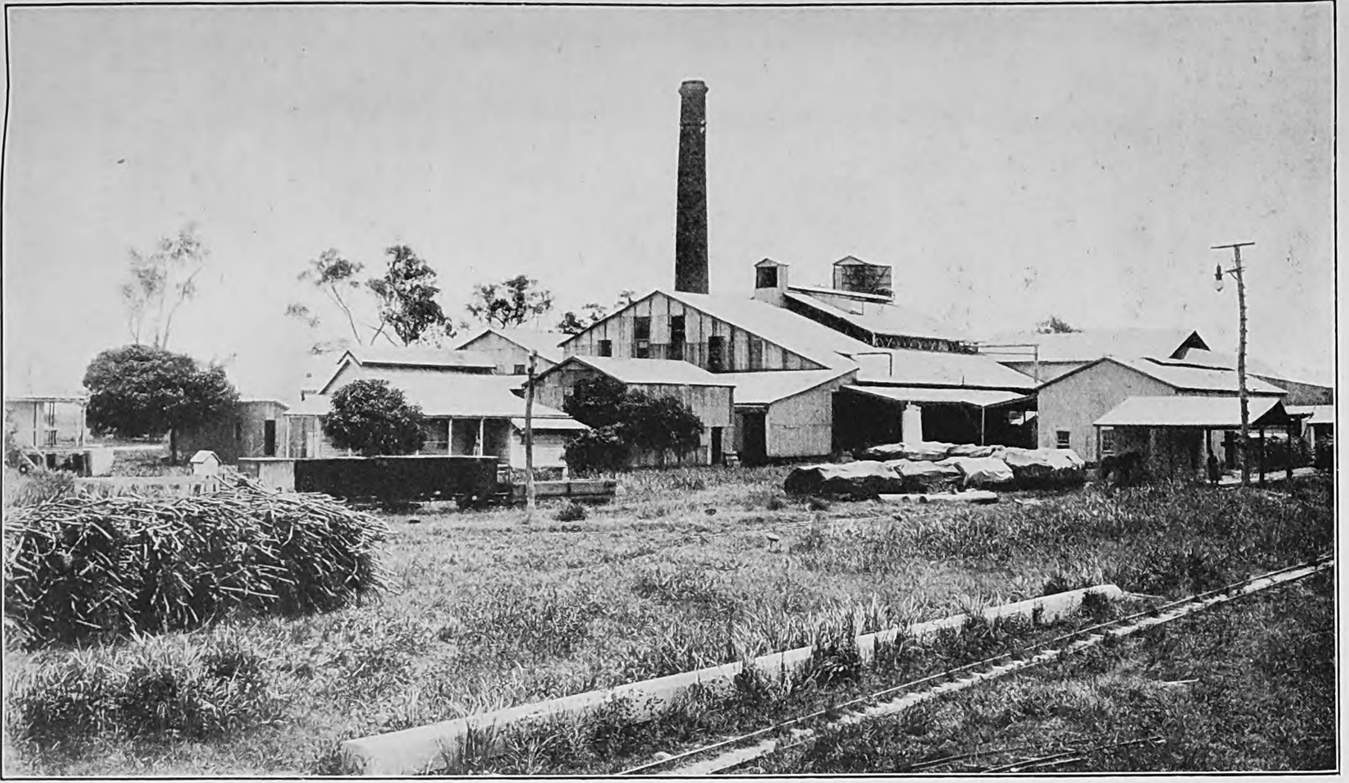

FIG. 4.—VICTORIA SUGAR MILL, INGHAM, QUEENSLAND.

climate is considered ideal for sugar-cane cultivation, and the rainfall is ample in ordinary seasons, although there are seasons, occasionally, when the lack of sufficient rainfall becomes a matter of serious concern to the growers.

The methods of sugar-cane cultivation in Australia follow, in general, the standards that are more or less common to all sugar-growing countries, with the exception that, whenever it is possible, machinery is used to do work which in other countries is done by hand labor. Cane planting and cutting machines, chiefly of local design and manufacture, are coming into use to a certain extent, although they are still to be considered in the experimental stage. American disk plows have been extensively used for many years in the sugar fields of Queensland, and thus far the competition of local manufacturers has not made much headway in the effort to curtail our trade. Owing to the labor situation, referred to elsewhere, American manufacturers of labor-saving machinery applicable to any of the various operations of sugar-cane growing and sugar manufacture are recommended to cultivate the Queensland market.

VARIETIES GROWN—YIELDS OF CANE.

Many hundreds of varieties of cane have been planted in Queensland. Mauritius, the West Indies, New Guinea, Java, and the Pacific islands have all been searched for suitable types, and the present plantings show varieties from all those lands. There are few mills that crush one variety only; a considerable number of different canes make up the total crushing. It would seem, however, that Demerara 1135 is one of the most common varieties grown. Stripped Singapore, Goru, Rappoe, Badila, and 1900 Seedling are also among the most widely grown canes at present.

The yields of sugar cane vary considerably from season to season. The averages for the Commonwealth range from 12.72 to 20.29 tons per acre. Those of New South Wales are very much higher, ranging from 21.36 to 30.21 tons per acre. The higher yields of New South Wales are undoubtedly the result of better farming methods rather than of more favorable climatic and soil conditions. The Australian yields of sugar per ton of cane are considered very satisfactory, averaging about 1 ton of 94 per cent net sugar from 9 tons of cane.

REFINERIES AND EXPERIMENT STATIONS.

The Colonial Sugar Refining Co., the largest sugar company in the British Empire, operates very extensively in Queensland, being the most important factor in connection with sugar growing, crushing, and refining in Australia. It has refineries in the principal trading centers of the Commonwealth and in New Zealand. It also operates in the Fiji Islands. This company maintains large engineering works where a great many of its own machinery requirements are built, and it also supplies its products to outside firms. A station for sugar-cane experiments and investigations is maintained by this company at Hambledon, and a competent entomologist, it is said, will be added to that institution in the near future.

The Queensland government maintains two cane experiment stations—one in the Mackay and the other in the Bundaberg district—

which are doing excellent work. The first-named station has supplied all the new varieties of cane to the farmers of Queensland up to this time.

COTTON.

Very large areas in the northern parts of Australia (chiefly in Queensland and to a less extent in the Northern Territory and the tropical portions of Western Australia) are said to have both climate and soil well suited for the cultivation of cotton. Experts have estimated, according to private reports, that this area is greater than that suitable for cotton in the United States. That cotton can be grown in those sections of Australia was conclusively proved at the time of the American Civil War, when, owing to the inducement offered by the prevailing high prices, Queensland exported 26,000,000 pounds of ginned cotton, worth $8,000,000. The industry, however, was subsequently abandoned, for it was impossible, apparently, to compete with the American product—chiefly on account of the high cost of production in Australia. This was partly due to inexperience. There was no skilled body of pickers familiar with the crop, and the picking was therefore slow. The high wages prevailing in Australia, however, were the chief deterring factor, and this condition has rather increased in recent years.

Cotton growing and the development of northern Australia are dependent on the labor situation, and this in turn is bound up with the questions of restricted immigration and the policy of a "white Australia."

POTATOES.

The principal potato-growing States are Victoria, Tasmania, and New South Wales, in the order given. In the year 1914–15, 357,614 tons of potatoes were produced from 148,328 acres. The suitability of the soil, climate, and general conditions of Tasmania for potato growing is evidenced by the high yields per acre that are almost invariably obtained in that State, the average yield during the past 10 years being 3¼ tons per acre. The average yield for the Commonwealth is 2.70 tons per acre. The lowest yield is in Queensland, with 1.78 tons per acre. With rare exceptions, Australia produces enough potatoes to provide for the wants of its population.

ORCHARDS, VINEYARDS, AND FRUIT GARDENS.

Fruit growing has made rapid strides in Australia in recent years. The acreage has increased from 146,775 in 1901 to 232,711 in 1914–15. The varieties of fruit differ materially in the several States, ranging from tropical fruits to strawberries and currants in the colder parts of the country. The principal fruits grown, however, are apples, nectarines, peaches, oranges, pears, apricots, bananas, lemons, and pineapples.

The area devoted to vines in the Commonwealth has shown a slow decrease in the past few years. In 1904–5, 65,673 acres were under vines, against 60,985 in 1914–15. Australian wines of various classes have been exported at the rate of about $500,000 worth per annum. While producing some excellent wines, the country, on the other hand, generally imports wines in values equal to or greater than the exportation, the imports consisting chiefly of sparkling wines.

Many American farm machines are to be seen in Australia in connection with orchards and vineyards. Australian manufacturers have not given much attention to producing machinery for these crops. A very large proportion of the machinery (other than that supplied for wheat growing) that is imported from the United States is intended for orchards, irrigated lands, and the growing of what may be considered minor crops.

It is hoped that Australia will eventually become an important factor in supplying Europe with fresh and preserved fruits, yet its considerable distance from those markets will probably place the Commonwealth under a distinct disadvantage in meeting the competition of the fruit growers of southern Europe and South Africa.

MINOR CROPS.

Among the more important minor crops of the Commonwealth are market-gardening products, pumpkins and melons, turnips, mangolds, nursery products, grass seed, tobacco, and millet. Hops are grown rather extensively near Hobart, Tasmania, the 1916 crop being estimated to have yielded 2,250,000 pounds. The total area devoted to minor crops in 1914–15 was 77,563 acres, of which market gardens accounted for 31,388 acres.

PASTORAL AND DAIRYING INDUSTRIES: INTRODUCTION.

The pastoral and dairying industries have always been important sources of wealth to Australia. Their increasing value in recent years indicates that both pastures and stocks are, on the whole, steadily improving. The satisfactory progress of agriculture has not checked the growth of these industries, even though in the more favored districts agriculture has crowded out the raising of cattle and sheep. In becoming established in regions hitherto unoccupied, these industries have always attained a healthier condition than they previously had. The greater experience of the pastoralists largely accounts for this improvement, for the fact can not be denied that the majority of them formerly used methods of a rather happy-go-lucky character, making comparatively little provision in the way of effective water conservation and the accumulation of stocks of fodder with which to tide over the unfavorable years. Too much reliance was placed on the well-known recuperative powers of the land, and it is only in recent times that the policy of simply letting the good years even up the losses incurred in bad seasons has come to be recognized as uneconomical and otherwise undesirable. For some time past great and increasing attention has been paid to the question of combating droughts by means of conserved water and stocks of fodder in the shape of hay and ensilage, and every year sees the Australian pastoralists better prepared to cope with the vagaries of the seasons.

When the value of the pastoral and dairying industries is combined it is found that they constitute the greatest source of Australia's wealth. Agricultural and pastoral pursuits have long been rivals for the place of honor among the various assets of the country, and the many factors at present connected with their development are so obscured, uncertain, and contradictory that it would be difficult to forecast which will eventually attain the foremost position. There seems to be a feeling among agriculturists that the scarcity of labor, its expensiveness, and the liability to droughts will create a tendency in the future to divert to pastoral pursuits some of the attention that would otherwise be given to agriculture.

In considering the importance and value of the pastoral and dairying industries of Australia, as reviewed in the following pages, the fact should not be overlooked that, in addition to the hides and skins treated in Australian tanneries, the country exports these at the rate of more than $15,000,000 per annum.

The white labor employed in these industries is thoroughly organized, and in certain parts of the country 44 hours constitute a week's work. There is a great deal of instability in connection with pastoral labor, and as a rule the labor unions, when each season is about to begin, present new schedules of rates and working conditions. Australian aboriginals are used in relatively large numbers as shepherds and cattlemen in the more remote parts of the country. They are endowed with remarkable powers of observation and keenness of sight and are able to track man or beast over country where white men would fail to note a trace.

The following table gives the number of cattle, sheep, horses, and pigs in Australia in 1914:

Political divisions.	Cattle.	Sheep.	Horses.	Pigs.
New South Wales	2,472,631	32,874,359	731,735	286,478
Victoria	1,362,542	12,051,685	552,053	243,196
Queensland	5,455,943	23,129,919	742,159	166,638
South Australia	300,579	4,208,461	267,877	69,893
Western Australia	863,835	4,456,186	161,625	59,816
Tasmania	176,524	1,674,845	42,232	34,960
Northern and Federal Territories	419,519	204,879	23,591	1,466
Total	11,051,573	78,600,334	2,521,272	862,447

CATTLE.

Throughout the Commonwealth cattle raising is carried out on a more or less extensive scale, the main object being the production of stock suitable for slaughtering purposes. The finest and largest herds of beef cattle are found in the tropical districts—that is, in northern Queensland, the Northern Territory, and the Kimberley districts in northwestern Australia.

The number of cattle in the Commonwealth in 1914 was 11,051,573, the percentage in the various States being as follows: Queensland, 49.37; New South Wales, 22.37; Victoria, 12.33; Western Australia, 7.28; Northern Territory, 3.75; South Australia, 2.72; and Tasmania, 1.60. Queensland and Western Australia, in particular, are rapidly increasing their number of cattle, and, together with the Northern Territory, they are looked upon as the chief cattle-raising centers of the future. A gradual decrease in the number of beef cattle is observable in the other States, largely due to the greater attention paid by farmers to agriculture and dairying.

During the year 1914, 2,089,852 head of cattle were slaughtered in Australia, and the frozen beef exported that year was valued at

$24,284,098, of which nearly $22,500,000 worth was shipped to the United Kingdom. For the five years preceding the season 1914-15 the value of the frozen beef exported was $56,229,186.

The beef-cattle breeds most largely represented in Australia are Shorthorns, Herefords, Devons, Aberdeen-Angus Black Polled, and Norfolk Red Polled.

DAIRYING.

The great impetus that the development of an export trade in Australian butter has given to the dairying industry of the Commonwealth has led to a considerable increase and improvement of the dairy herds of Victoria, New South Wales, and southern Queensland, the subtropical portions of Australia being apparently the best adapted to this industry.

In 1914 there were 2,019,371 dairy cows in the Commonwealth, of which 72 per cent were in the States of Victoria and New South Wales. Queensland is rapidly increasing its importance as a dairy producer. In 1915 Australia had 533 establishments devoted to the manufacture of butter, cheese, and condensed milk. A rather large number of beef-cattle raisers have in recent years taken up dairying. Milking Shorthorns, Ayrshires, Jerseys, and Holsteins are the breeds of dairy cattle most in evidence throughout Australia.

The production of butter in 1914 is given as 193,970,412 pounds, New South Wales, Victoria, and Queensland contributing 84,134,280, 62,421,288, and 37,230,240, respectively. The net exports of Australian butter that year were more than 50,000,000 pounds, valued at $12,090,420, the figures for both quantity and value being only about one-half those of 1911. A number of circumstances are responsible for these decreased exports of butter, the greater attention paid to other branches of dairying being one of the most important. The production of butter will assuredly remain an important and steadily growing Australian industry.

Cream separation and butter making are often carried on under the cooperative system. The creation of large central butter factories, supplied by numerous separating establishments and creameries, has considerably reduced the cost of manufacture, since improved appliances, such as refrigerators, may be profitably worked at the larger establishments. Another advantage is that the product obviously is of a more uniform quality. The number of farmers who adhere to hand processes is rapidly diminishing. Separator butter requires less than 2½ gallons of milk per pound of butter, whereas handmade butter necessitates about 3 gallons of milk. The average yield per cow is 300 gallons of milk. This varies considerably with localities and seasons, as in some districts yields of 500 gallons are not uncommon.

In 1914 32,052,694 pounds of condensed milk were produced, against 12,500,000 pounds in 1910. Since 1912 no milk has been imported; on the contrary, milk worth about $200,000 is now exported every year.

Cheese at the rate of 20,000,000 pounds per annum is produced in Australia. This industry shows a fairly steady increase. The net exports of cheese in 1914 were valued at $303,056.

SHEEP AND WOOL.

A multitude of circumstances have created exceptionally favorable conditions for the raising of sheep and for the production of wool in Australia. The dry atmosphere prevailing in vast sections of the country, the comparatively low rainfall, and the natural growth of extremely sweet, nutritive, and hardy grasses enable Australia to produce wool that places the country in a foremost position so far as that industry is concerned. The native grasses of Australia are exceptionally valuable not only for their fattening and wool-producing qualities but also for their remarkable ability to withstand the effects of drought. No cultivated grasses or plants have yet been found that can equal in drought-resisting qualities the native grasses, salt bushes, and edible fodder plants. Practically the entire Merino clip is grown on natural grasses only, without the aid of artificial fodder. In favored localities small areas of alfalfa are cultivated, and where stud stock is kept a certain amount of artificial feeding is done. In raising cross-bred sheep considerable use is made of hay and fodder, and the intensive raising of this class of sheep in irrigated lands is a growing industry.

Land that will support a sheep to the acre is considered really good sheep country in Australia, and there is little of it. The capacity of the land in the natural state varies from 1 to 18 acres per sheep. The country as a whole is remarkably free of sheep diseases. In the hot, dry interior parasites such as ticks and lice can not live. In the districts of greater rainfall, where most of the sheep are carried, parasitical pests are met with and are kept down only by regular dipping. For more than a quarter of a century there has not been a vestige of scab in Australia, on account of the rigorous legislation passed before that time to eliminate this pest from the country.

NUMBER OF SHEEP IN COMMONWEALTH AND IN VARIOUS STATES.

At the end of the year 1914–15 the number of sheep in the Commonwealth was about 70,000,000. This is considerably less than the number recorded in 1890, when the total reached nearly 98,000,000. There is no doubt, however, that the farmers in the early years of the industry had gone beyond what might be considered the fair stock-carrying capacity of their holdings. By the year 1900 the total had fallen to 71,000,000 and by 1902 to 54,000,000. After that year a succession of very favorable seasons brought the total up to 93,000,000 in 1911. A severe drought was experienced over nearly the whole of Australia during the earlier months of 1912, and this had the effect of reducing the number of sheep to 83,000,000. The drought of 1914–15 again affected the sheep industry unfavorably. The three good seasons experienced since that year and the prevalence of very high prices for wool have undoubtedly caused a substantial increase in the number of sheep in the country. Owing to the vagaries of the seasons it can not be said that Australia has the largest number of sheep of any country, but Argentina is the only one that can dispute its claim to that distinction.

The percentage of sheep in the various States is as follows: New South Wales, 41.83; Victoria, 15.33; Queensland, 29.43; South Australia, 5.35; Western Australia, 5.67; Tasmania, 2.13. The Northern

Territory has 70,000 and the Federal Territory 134,679 sheep. While New South Wales has the largest number, records show that its important place in the industry is slowly waning, since in 1901 that State had 58.10 per cent of the sheep in the Commonwealth. This is probably due to the fact that the farmers of that State are gradually giving greater attention to agriculture and dairying. On the other hand, the number of sheep in Queensland is rapidly increasing, since in 1901 it had only 13.92 per cent of the sheep in Australia. Western Australia is also increasing its sheep flocks. The remaining States show little change in this connection.

For the past five years the number of sheep, including lambs, slaughtered in the Commonwealth has averaged 14,000,000 head per annum. The exports of frozen mutton and lamb in the years 1913 and 1914–15 averaged $15,554,732 per annum, whereas in 1903 the value of these exports was only $2,394,873. The United Kingdom takes about 95 per cent of the mutton and lamb exported by Australia.

PRODUCTION OF WOOL.

Wool is much the largest factor in the pastoral industry of Australia. The qualities of Australian wool are well known and evidenced in the prices paid for it by foreign purchasers. There was a sharp decline in production during the year 1902, owing to bad seasons, but the great recovery that has since taken place shows unmistakably the wonderful recuperative powers possessed by Australia. The great bulk of the wool produced in Australia is exported, the quantity used yearly in the woolen mills of the Commonwealth being normally about 11,000,000 pounds greasy. Since the war started the capacity of the woolen mills of Australia has nearly doubled, and approximately 20,000,000 pounds of wool are used in them at present.

The average production of wool during the five years ended with the season 1914–15 was approximately 690,000,000 pounds per annum, of which all but about 2 per cent was exported. The value of wool exports during the season ended June 30, 1915, was $121,891,225, and the total value of the wool exports of the six preceding years was $752,503,406. About 45 per cent of these exports were destined for the United Kingdom. France, Belgium, and the United States (and Germany before the war) have also been large buyers of Australian wool.

A feature of the wool industry of Australia during the period of the war is the high prices paid for wool. Greasy Merino wool recently made a record by selling at 28½d. (57 cents) per pound, and prices have materially improved since that time. Lately 39½d. (80 cents) was realized for certain bales of superfine scoured wool.

There is a decided tendency to produce crossbred wool instead of Merino wool. In 1906–7, 96 per cent of the wool sold in the Sydney market was Merino and only 4 per cent crossbred. In 1915–16 these percentages were 84.49 and 15.51, respectively. Throughout Australia considerable attention is now being paid to the breeding of a class of sheep that will best meet the requirements of consumers. Crosses between the Merino and the Lincoln, and between the Merino and the Leicester breeds have proved exceedingly valuable, as they furnish both a good quality of wool and also an excellent carcass for export purposes.

During the year 1916 the Imperial Government, with a view to relieving the unfavorable situation caused by the scarcity of shipping, purchased all the unsold wool in Australia at an average price of 15½d. (31 cents) per pound. Separate prices will be paid under this scheme for wool of different grades and values, but when the entire clip is appraised and valued the average price will be 15½d. Various estimates place the value of the 1917 clip as being not far short of $200,000,000.

HORSES.

Australian horses, whether of heavy draft, medium weight, or the light saddle and carriage variety, compare more than favorably with the product of other lands. The exports of Australian horses form a not inconsiderable item. During the year 1915, 24,107 horses were exported, valued at $2,233,483, the majority going to India.

In all the States, except in some parts of Queensland, horses are invariably used for draft purposes in connection with the operation of farm machinery. As a rule very fine and heavy animals are used, and manufacturers of farm machinery should pay strict attention to the supplying of suitable eveners and singletrees whenever importers indicate that ordinary specifications must be altered to meet the requirements of the country.

FARMYARD PRODUCE.

In addition to providing for local requirements, Australia exports bacon, ham, and lard at the rate of approximately $500,000 per annum. This industry, however, is not showing anything like the notable progress made by other branches of Australian farming.

The value of the poultry produced in Australia in 1914–15 was about $22,500,000. This industry is attaining a growing importance, although about $250,000 worth of eggs are still imported every year. Frozen poultry, however, is being exported in moderate quantities.

RABBITS.

Rabbits are undoubtedly a great pest to Australian farmers in certain sections of the country, and notwithstanding the large numbers that are trapped or poisoned the supply seems inexhaustible. In some respects, however, rabbits have become a factor in the economic life of the country. For a number of years the rabbit export trade to the United Kingdom has been an important consideration. The 1914–15 exports of frozen rabbits and hares were valued at $2,528,588, and those of rabbit and hare skins at about $280,000. With the advent of high meat prices in Europe the demand has increased to such an extent that the military authorities of Great Britain recently decided to purchase the whole of the surplus of frozen rabbits. The total exports of frozen rabbits to the United Kingdom during 1916 amounted to 10,290,000 pairs. Trapping of rabbits is a very lucrative employment, the prices paid by the freezing works guaranteeing to good trappers earnings of from $25 to $50 per week. Rabbits are trapped by means of ordinary small gin traps, which are set in large numbers near the warrens and pegged to the ground.

V. CONDITIONS IN AGRICULTURAL-MACHINERY TRADE.

From the preceding review of the character of its agriculture, it is readily apparent that Australia is essentially a machine-farming country. It would indeed be difficult to find another country in which the value of the farm machinery used in relation to the value of the crops is greater than in Australia. It is estimated that an investment of $2,500 to $3,000 in farm machinery is necessary to equip a wheat farm of 750 to 1,000 acres, with one-third of this area under crop in any one year and with a yield of about 10 bushels to the acre.

In several important respects, and chiefly when farm machinery is involved, agricultural practices differ very materially from those in general vogue in the United States. The fact that the land is not cleared of stumps and other obstructions makes it indispensable for the stump-jump feature to be embodied in nearly all tillage implements, and for the same reason all the other machines must be strongly built. These circumstances do not prevail in agriculture as practiced elsewhere, and this condition undoubtedly constitutes a disadvantage in the general adoption of farm machinery manufactured outside of Australia. The extensive character of Australian farming, furthermore, has led to the use of larger horse-drawn implements than are ordinarily used in other countries. While in recent years the local manufacturing of farm machinery has become largely concentrated in the hands of a few important Australian firms, and this has brought about a certain amount of standardization and a reduction in the types of machines built, there is still a decided tendency among some of the manufacturers to furnish implements to suit the personal ideas of the purchasers. This is another disadvantage from the American manufacturers' point of view, since the latter are not in a position to compete successfully with the Australian makers in this respect.

IMPORTANCE OF THE DEMAND.

Allowing for certain variations from year to year, it can be said that the value of the agricultural machinery required by the farmers of Australia amounts to $11,000,000 per annum. To this the local factories contribute about $7,000,000 and the importations $4,000,000. This gives an idea of the importance of the country as a market for the sale of that class of goods.

The present demand for farm machinery is, therefore, of a very substantial character already, and in the normal course of events Australia is destined to become an even more attractive market for such articles. The increasing efficiency of farm tractors should eventually prove a most important factor in developing the resources of the country along agricultural lines. The potentialities of the market, in spite of the present difficulties in the path of the average American manufacturer, deserve the utmost attention—especially on the part of those who produce a fair number of the machines indicated in this report as largely used in Australia. Small firms, however, can hope to create a satisfactory business only if they cooperate with each other and combine to maintain the effective selling organization required in a country where the implement business is highly developed. Unless manufacturers and exporters are prepared to do things in a rather big way, they can scarcely hope ever to win a satisfactory share of that business. A large and varied demand for farm machinery undoubtedly exists to-day and will continue and increase as the years pass. The chief question is how American makers may effectively secure and hold a demand in face of the exceptionally strong interests that now control the Australian farm-machinery trade.

STATISTICS OF IMPORTS.

The imports of agricultural machinery and related lines during the years 1912, 1913, 1914–15, and 1915–16 are given in the table below, which also shows the amounts imported by each State.

To facilitate a clear understanding of their character it may be advisable to group the several items and to give an approximate idea of their normal value, taking into consideration the value of the imports in the years reviewed and the restricted demand for certain articles during the last two seasons as a result of high prices and shipping difficulties.

Items 1 and 2 consist of dairying machinery, which is imported at the rate of $500,000 to $600,000 per annum.

Items 3 and 4 consist of gas and steam engines for all purposes, agricultural and industrial. A considerable proportion of the gas and oil engines are used for agriculture, whereas steam engines are doubtless used more largely in industrial pursuits than in agriculture. It can be estimated that the total value of the imports in these lines is approximately $1,500,000 per annum.

Items 5, 6, and 7 consist of harvesting machinery, the approximate value of the imports being $1,250,000 per annum.

Items 8 and 9 consist of drills and parts thereof, imported at the rate of $300,000 per annum.

All the other items combined, consisting of general agricultural machinery not mentioned elsewhere, are imported at the rate of $1,250,000 per annum.

Articles and importing States.	1912	1913	1914–15	1915–16
Item No. 1.—Churns of all kinds; cheese presses; dairy coolers; refrigerators other than for household use; supply cans; incubators, not elsewhere included; brooders:				
New South Wales	$39,861	$59,454	$55,245	$46,246
Victoria	24,552	15,524	14,565	12,371
Queensland	8,035	14,244	24,405	18,726
South Australia	12,565	16,269	8,001	5,513
Western Australia	4,545	8,453	2,195	978
Tasmania	749	613	2,837	9,626
Total	90,307	114,557	107,248	93,490
Item No. 2.—Cream separators:				
New South Wales	179,496	196,159	161,125	120,777
Victoria	184,400	243,442	106,800	92,590
Queensland	36,693	36,294	27,788	21,476
South Australia	26,459	27,292	11,597	28,824
Western Australia	2,682	1,066	1,523	2,131
Tasmania	15,884	6,156	2,462	837
Total	445,674	510,409	311,295	266,635

Articles and importing States.	1912	1913	1914–15	1915–16
Item No. 3.—Gas and oil engines:				
New South Wales	$406,431	$323,885	$402,547	$391,748
Victoria	158,750	147,367	104,863	32,975
Queensland	82,122	197,721	197,298	138,588
South Australia	147,800	173,530	126,553	140,764
Western Australia	54,106	87,461	63,449	48,329
Tasmania	1,616	6,463	2,604	3,305
Total	850,825	936,427	897,314	755,709
Item No. 4.—Portable and traction high-speed reciprocating steam engines:				
New South Wales	329,481	308,731	110,387	136,281
Victoria	179,817	138,087	95,271	72,029
Queensland	144,662	122,319	43,346	41,930
South Australia	50,281	35,613	6,137	8,215
Western Australia	75,450	60,544	33,199	9,991
Tasmania	51,040	40,066	5,577	9,431
Total	830,731	705,360	293,917	277,877
Item No. 5.—Stripper harvesters:				
New South Wales	114,558	132,427	207,527	48,329
Victoria	95,680	118,996	200,344	9,850
Queensland	....	13,344	21,831	28,026
South Australia	66,588	20,060	91,515	1,217
Western Australia	29,189	91,232	147,873	1,211
Total	306,015	376,059	669,090	88,633
Item No. 6.—Metal parts for stripper harvesters and strippers:				
New South Wales	2,716	5,913	23,822	1,645
Victoria	12,444	15,042	24,576	3,153
Queensland	58	944	3,197	895
South Australia	6,915	6,064	7,728	545
Western Australia	4,258	3,635	18,755	477
Total	26,391	31,598	78,078	6,715
Item No. 7.—Mowers, reapers, and reaper-binders:				
New South Wales	156,706	201,828	175,058	234,273
Victoria	202,116	321,335	179,414	405,910
Queensland	8,010	43,745	21,267	43,258
South Australia	103,637	148,915	49,249	62,306
Western Australia	61,299	70,467	44,704	36,800
Tasmania	3,007	3,450	3,032	10,853
Total	534,775	789,740	472,724	793,400
Item No. 8.—Seed and grain fertilizer drills:				
New South Wales	152,764	49,351	24,702	87,899
Victoria	77,791	83,967	73,810	116,173
Queensland	11,519	4,826	10,108	18,994
South Australia	137,634	50,514	32,460	47,930
Western Australia	44,470	45,682	28,902	14,526
Tasmania	4,818	4,360	1,742	3,402
Total	428,996	238,700	171,724	288,924
Item No. 9.—Attachments for seed and fertilizer drills:				
New South Wales	7,246	9,027	4,701	7,426
Victoria	23,573	26,192	10,375	7,820
Queensland	497	341	1,913	735
South Australia	12,522	7,806	1,304	2,759
Western Australia	1,080	180	1,927	....
Tasmania	10	58	....	2,127
Total	44,928	43,604	20,220	20,867
Item No. 10.—Chaff cutters and horse gears; chaff-cutter knives; corn shellers; corn huskers; cultivators, harrows, and plows, not elsewhere included; plowshares and moldboards; scarifiers:				
New South Wales	228,988	171,267	214,871	222,297
Victoria	203,313	208,106	155,640	169,306
Queensland	126,276	81,606	140,622	120,061
South Australia	35,978	48,655	36,572	31,365
Western Australia	73,134	69,105	71,255	42,976
Tasmania	19,534	25,505	16,561	27,840
Total	687,223	604,244	635,521	613,845

Articles and importing States.	1912	1913	1914-15	1915-16
Item No. 11.—Combined corn shellers, huskers, and baggers; combined corn shellers and huskers; disk cultivators; stump-jump plows; winnowers; seats, poles, swinglebars, yokes, and trees for agricultural machines, when imported separately:				
New South Wales	$7,645	$8,093	$15,115	$10,341
Victoria	18,040	23,534	14,094	23,598
Queensland	17,388	7,543	30,026	14,755
South Australia	3,149	15,403	4,035	3,874
Western Australia	14,974	29,496	6,005	19,480
Tasmania	1,523	2,297	2,628	1,602
Total	62,719	86,366	71,903	73,650
Item No. 12.—Agricultural machinery not elsewhere specified, including cane loaders, unloaders, and harvesters; channel-making graders; garden and field spraying machines, rollers, hose reels, syringes; horse road rollers and machines; lawn mowers, sweepers, and sprinklers; road scoops and scrapers; stump extractors (all these articles dutiable):				
New South Wales	86,094	69,464	87,699	74,944
Victoria	75,898	90,308	68,335	67,693
Queensland	14,492	14,308	33,340	18,098
South Australia	18,308	17,028	13,500	5,299
Western Australia	10,969	9,032	7,797	7,432
Tasmania	8,015	7,650	8,818	1,285
Total	213,776	207,790	219,489	174,751
Item No. 13.—Other agricultural machinery (free of duty), including testers and pasteurizers; cotton gins; fiber-scutching machines; hand-worked rakes and plows combined; hay tedders; horse rakes; alfalfa bunchers; corn harvesters; corn binders; milking machines; moldboard plates in the rough and not cut into shape; potato raisers or diggers; potato sorters; root cutters, pulpers, and graters; straw stackers; subsurface packers; thrashing machines; etc.:				
New South Wales	51,906	47,025	45,463	47,842
Victoria	128,408	145,708	63,931	63,440
Queensland	13,086	13,242	23,958	16,244
South Australia	19,670	18,809	11,261	16,736
Western Australia	9,971	15,247	10,307	12,755
Tasmania	9,237	5,912	4,297	5,952
Total	232,278	245,943	159,217	162,969

The table below gives the imports of agricultural machinery and related lines from the United States, the United Kingdom, Canada, and Germany, and the total for all countries, for the years 1912, 1913, 1914-15, and 1915-16:

Articles.	Year.	Total.	United States.	United Kingdom.	Canada.	Germany.
Item No. 1.—Churns of all kinds; cheese presses; dairy coolers; refrigerators other than for household use; supply cans; incubators, not elsewhere included; brooders.[1]	1912	$90,307	$40,426	$13,670	....	$10,925
	1913	114,557	51,760	11,066	$161	9,193
	1914-15	107,248	43,896	14,366	....	1,236
	1915-16	93,490	32,138	11,018	1,231	3,572
Item No. 2.—Cream separators[2]	1912	445,674	33,593	64,014	....	23,588
	1913	510,409	13,320	46,937	....	23,062
	1914-15	311,295	13,456	20,585	....	3,713
	1915-16	266,635	5,195	12,137	1,450	....
Item No. 3.—Gas and oil engines[3]	1912	850,825	179,866	619,082	....	13,957
	1913	936,427	184,114	720,909	1,289	3,981
	1914-15	897,314	231,859	615,792	15,879	3,601
	1915-16	755,709	275,132	410,859	14,137	....
Item No. 4.—Portable and traction high-speed reciprocating steam engines.	1912	830,731	241,743	587,279	....	1,484
	1913	705,360	270,898	425,230	2,988	6,244
	1914-15	293,917	123,726	152,458	....	17,733
	1915-16	277,877	137,629	139,000	248	....

[1] Denmark and Sweden contribute to these imports.

[2] Sweden has the bulk of this trade. Belgium, before the war, also contributed to it.

[3] The imports from the United States consist almost entirely of engines for agricultural and pastoral work, and the number of these shows a steady increase.

Articles.	Year.	Total.	United States.	United Kingdom.	Canada.	Germany.
Item No. 5.—Stripper harvesters[1]	1912	$306,015	$76,462	....	$229,553	....
	1913	376,059	57,502	....	318,556	....
	1914–15	669,090	117,901	....	551,189	....
	1915–16	88,633	67,590	....	20,644	....
Item No. 6.—Metal parts for stripper harvesters and strippers.	1912	26,391	4,380	$866	21,145	....
	1913	31.598	4,988	....	26,610	....
	1914–15	78,078	13,670	....	63,741	....
	1915–16	6,715	3,236	5	3,434	....
Item No. 7.—Mowers, reapers, and reaper-binders.	1912	534,775	193,643	50,903	290,218	....
	1913	789,740	298,063	79,523	411,910	....
	1914–15	472,724	255,467	35,579	181,676	....
	1915–16	793,400	352,101	18,011	432,264	....
Item No. 8.—Seed and grain fertilizer drills.	1912	428,996	144,304	49	314,644	....
	1913	238,700	62,539	302	175,734	$126
	1914–15	171,724	36,061	44	135,537	....
	1915–16	288,924	115,477	....	173,447	....
Item No. 9.—Attachments for seed and grain fertilizer drills.	1912	44,928	13,315	423	27,087	....
	1913	43,604	15,709	146	25,038	2,706
	1914–15	20,220	5,455	19	14,745	....
	1915–16	20,867	4,779	1,464	14,614	....
Item No. 10.—Chaff cutters and horse gears; chaff-cutter knifes; corn shellers; corn huskers; cultivators, harrows, and plows, not elsewhere included; plowshares and moldboards; scarifiers.[2]	1912	687,223	246,415	145,849	269,069	5,032
	1913	604,244	226,818	123,765	232,760	2,175
	1914–15	635,521	223,241	112,732	283,444	....
	1915–16	613,845	199,882	98,581	296,301	....
Item No. 11.—Combined corn shellers, huskers, and baggers; combined corn shellers and huskers; disk cultivators; stump-jump plows; winnowers; seats, poles, swinglebars, yokes, and trees for agricultural machines, when imported separately.[3]	1912	61,719	31,842	960	29,588	....
	1913	86,366	43,239	1,645	50,139	331
	1914–15	71,903	55,935	856	14,896	....
	1915–16	73,650	49,161	628	23,860	....
Item No. 12.—Agricultural machinery not elsewhere specified, including cane loaders, unloaders, and harvesters; channel-making graders; garden and field spraying machines, rollers, hose reels, syringes; horse road rollers and machines; lawn mowers, sweepers, and sprinklers; road scoops and scrapers; stump extractors (all these articles dutiable).	1912	213,776	128,709	55,361	11,538	10,594
	1913	207,790	131,381	41,633	14,595	5,397
	1914–15	219,489	152,146	54,184	7,704	....
	1915–16	174,751	113,335	44,008	15,791	....
Item No. 13.—Other agricultural machines (free of duty), including testers and pasteurizers; cotton gins; fiber-scutching machines; hand-worked rakes and plows combined; hay tedders; horse rakes; alfalfa bunchers; corn harvesters; corn binders; milking machines; moldboard plates in the rough and not cut into shape; potato raisers or diggers; potato sorters; root cutters, pulpers, and graters; straw stackers; subsurface packers; thrashing machines; etc.	1912	232,278	52,908	116,377	27,145	2,862
	1913	245,943	81,412	121,380	23,826	725
	1914–15	159,217	56,753	67,211	21,335	....
	1915–16	162,969	68,802	60,680	22,065	....

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[1] The considerable falling off in 1915–16 of imports under this heading, which also includes reaper-thrashers, was due to the failure of the wheat crop in 1914–15. Many of the machines imported that year remained unsold in the hands of importers, and this fact obviated the necessity of large importations in 1915–16. The threatening rise of ocean freights may also have caused machines to be brought in during 1914–15 that otherwise would have been imported during the following season. It is expected that the share of the United States in this trade will steadily increase in the next few years.

[2] Spring-tooth harrows undoubtedly form one of the principal components of this item, and in these Canada is doing a good business. Chaff cutters and horse gears are supplied chiefly by the United Kingdom and New Zealand. Plows, especially disk and walking plows, are largely imported from the United States. Canada supplies most of the moldboard gang plows used in Australia.

[3] The small value of these imports is due to the fact that the articles enumerated constitute those most extensively manufactured in Australia.

POSITION OF UNITED STATES IN IMPORT TRADE.

Considering only those items in the preceding table that include the machines essentially used in field work (items 5 to 13, inclusive), it will be seen that Canada enjoys a position of supremacy in the imports of agricultural machinery into Australia, which is the more significant by reason of the fact that practically only one Canadian manufacturer contributes to the trade. While it does not seem likely at the present time that American exports to Australia will equal those of Canada for some time to come, a decided improvement is observable in many lines that the United States exports to that country.

Canada ships twice as many grain drills to Australia as the United States, and it has a slightly larger share of the trade for those machines included in item No. 10. It also ships three times more reaper-thrashers (included in the statistics with stripper harvesters), and its trade in binders, reapers, and mowers is also substantially larger than that of the United States.

The trade of the United States, on the other hand, is one-third larger than Canada's in the machines included in item No. 11, many times larger in the case of item No. 12, and three times greater in item No. 13.

The United Kingdom's preponderance is confined to the machines included in item No. 13; these are imported free of duty so far as that country is concerned, whereas if they come from other countries they are assessed a duty of 10 per cent. The British share of the trade in the machines composing item No. 10 is only one-half that of the United States or Canada. In item No. 12 it is greater than the Canadian but considerably less than the American. The United Kingdom's share of the imports other than those separately mentioned is altogether unimportant, and its contribution to the imports of reapers, binders, and mowers, which attained some importance in former years, is rapidly decreasing to an almost insignificant figure.

In respect to the other items in the statistics of imports (Nos. 1 to 4, inclusive) it may be said that the American trade in dairy appliances, other than cream separators, is not only being maintained but is showing a good increase. A steady decline, however, is observed in cream separators, in which, however, the American share has never been of importance. That the United States is supplying Australia with an increasing number of gas and oil engines is clearly shown in the preceding statistics, which also indicate that it is making severe inroads into the trade of the United Kingdom in these lines. The increasing popularity of American gas engines and the introduction of farm tractors, which are doubtless included with the item covering gas and oil engines, largely account for this improvement. While the actual value of American trade in steam engines has notably decreased, the proportion of the total imports of these goods is considerably higher. Canada's participation in the imports under these four groups is almost nil.

Canada's enviable position in the agricultural-machinery import trade of Australia is the result of the determination with which one of the largest Canadian manufacturing concerns set itself to the task of winning this market. In at least one particular the success of that firm demonstrates a fundamental principle, the more general adoption of which would undoubtedly lead to greater success in foreign trade work in the majority of cases. This is the efficacy of concentrating most of the effort in one particular foreign field. The firm mentioned has done so by taking special care to develop and cultivate the possibilities in Australia. While it has also a large trade in other countries, it has doubtless made its principal effort in the Commonwealth and has considered that as the favorite field for its activities. Its position in Australia is largely due to the fact that it was the first foreign firm to establish an extensive selling organization there, able to give the necessary service to insure the success of its goods in the hands of the users. In all the capital cities of Australia it maintains branches and warehouses of so elaborate a type as to remind one of the establishments that American manufacturers maintain in the largest farm-machinery distributing centers of the United States. The number of its employees mounts into the hundreds. It has also paid the closest attention to the production of machines that will satisfactorily meet the requirements of the country. Its reaper-thrashers, binders, grain drills, and spring-tooth harrows, all of which are extensively used in Australia, are regarded as unsurpassed by any local or foreign makes.

One of the largest American manufacturers established a similar organization in Australia a few years later, and it has striven with success to equal the service and business efficiency of the Canadian firm referred to. The aggressiveness of these two firms and that of the largest agricultural-machinery manufacturer of Australia has been such that some years ago Australia was the battle ground for the fiercest competition that has probably ever attended the sale of this class of goods. This led to the adoption of certain practices, such as the giving of extremely long credits, the lowering of prices, and the trading in of used machines when new ones were purchased. At present, after many years, these conditions are still somewhat in evidence and have caused many of the smaller importers and firms engaged in the sale of farm machinery to give up their interest in that business, as they were unable to cope with the state of affairs thus brought about.

There is now a better understanding between all those interested in the sale of farm machinery in Australia, but the number of firms is much smaller than formerly, and this fact accounts for the difficulty that many American firms have had in obtaining agents who would push their lines aggressively. In all probability 80 per cent of the imports of farm machinery are effected by the American and Canadian firms referred to; and this, when one considers the extent of the imports, shows the small trade that the other foreign firms have in the country.

DUTIES ON IMPORTED FARM MACHINERY.

According to the tariff of December 3, 1914, the rates of duty shown below are assessed by the Commonwealth on imported agricultural implements and machinery and related lines. Contrary to the idea held by many American manufacturers, imports from Canada are subject to the same duties as those from the United States. In both cases the "general tariff" is applied.

Duties are assessed on the f. o. b. value of the goods at port of shipment, plus 10 per cent. For other details, which all shippers to Australia should necessarily take into account, they are urged to read the report "Exporting to Australia: Practices and regulations to be observed by American shippers," Miscellaneous Series No. 45, by Philip B. Kennedy, American commercial attaché at Melbourne, which is procurable from the Government Printing Office, Washington, D. C., at 5 cents per copy.

Classes.	Tariff on goods the produce and manufacture of the United Kingdom.	General tariff.
Agricultural, horticultural, and viticultural machinery and implements, viz:		
(*a*) Testers and pasteurizers; cotton gins; fiber-scutching machines; hand-worked rakes and plows combined; hay tedders; horse rakes; alfalfa bunchers; corn harvesters; corn binders; milking machines; moldboard plates in the rough and not cut into shape; potato raisers or diggers; potato sorters; root cutters, pulpers, and graters; straw stackers; subsurface packers; thrashing machines; winnower forks (wood and steel); hand-worked cultivators; hand-worked seed drills ... ad valorem	Free	10 per cent.
(*b*) Cream separators; sheep-shearing machines, not including the flexible shafting or any part above it ... ad valorem	Free	10 per cent.
Agricultural, horticultural, and viticultural machinery and implements not elsewhere specified, including cane loaders, unloaders, and harvesters; channel-making graders; garden and field spraying machines, rollers, hose reels, garden syringes; horse road rollers and machines; lawn mowers, sweepers, and sprinklers; road scoops and scrapers; stump extractors ... ad valorem	20 per cent	25 per cent.
Chaff cutters and horse gears; chaff-cutter knives; corn shellers; corn huskers; cultivators, harrows, and plows not elsewhere indicated; plowshares; plow moldboards; scarifiers ... ad valorem	20 per cent	25 per cent.
Combined corn shellers, huskers, and baggers; combined corn shellers and huskers; disk cultivators; drills (fertilizer, seed, and grain) not elsewhere indicated and all attachments thereto; stump-jump plows; winnowers (horse and other power); seats, poles, swinglebars, yokes, and trees for agricultural machines, when imported separately ... ad valorem	25 per cent	30 per cent.
Disks for agricultural implements ... ad valorem	Free	10 per cent.
Churns of all kinds; cheese presses; dairy coolers; refrigerators other than for household use; supply cans; incubators, not elsewhere indicated; "foster mothers" (brooders) ... ad valorem	25 per cent	30 per cent.
Stripper harvesters ... each	£12 ($58.40)	£14 ($68.13).
Strippers ... each	£6 ($29.20)	£7 ($34.07).
Metal parts for stripper harvesters ... per pound	1¾d. ($0.035)	2d. ($0.04).
Locomotives, traction and portable engines, road rollers (except horse road rollers), including scarifier attachment ... ad valorem	25 per cent	30 per cent.
Electrotypes and stereotypes per block of 12 square inches and under	1s. 6d. ($0.37)	2s. ($0.49).
For every square inch over 12 square inches	1½d. ($0.03)	2d. ($0.04).
Vehicles not elsewhere indicated ... ad valorem	35 per cent	45 per cent.

FARM-MACHINERY MANUFACTURING IN AUSTRALIA.

The official yearbook of the Commonwealth contains the following statement concerning the establishment and evolution of farm-machinery factories in Australia:

> The manufacture of agricultural implements and machinery is an important industry of Australia, and is of particular interest owing to the fact that it is one of the first industries to which what has been called the "new-protection" system was sought to be applied. The nature of the machines manufactured may be gathered from the machines scheduled in the customs tariff, which includes stripper harvesters, strippers, stump-jump plows, disk cultivators, winnowers, corn shellers and baggers, drills, and other implements usually employed in agriculture. The stripper harvester, which combines the stripper with a mechanism for winnowing and bagging grain, is an Australian invention, and is exported to many countries.

The table following shows the progress of this industry during the years 1909 to 1914, and this advancement, it will be noted, has been quite satisfactory. Notwithstanding a general decline in the year 1914, the number of establishments increased 4 per cent during the six years under review, the value of plant and machinery more than 90 per cent, and the value of output about 15 per cent.

Items.	1909	1910	1911	1912	1913	1914
Number of factories	148	150	155	159	154	154
Number of employees	4,081	4,868	5,156	4,733	4,444	3,865
Actual horsepower of engines used	1,713	2,228	2,347	2,419	2,698	2,665
Value of raw material worked up	$2,721,058	$3,615,963	$3,948,296	$3,657,640	$4,012,701	$3,645,751
Value of final output	$5,972,842	$7,595,968	$8,060,693	$7,486,635	$7,476,692	$6,880,200
Value added in process of manufacture	$3,251,784	$3,980,005	$4,112,397	$3,828,995	$3,463,991	$3,234,449

The following table gives details of the agricultural-implement works of Australia, by States, for the year 1914:

Items.	New South Wales.	Victoria.	Queensland.	South Australia.	Western Australia.	Tasmania.	Commonwealth.
Number of factories	24	65	6	54	4	1	154
Number of employees	599	1,968	104	952	237	5	3,865
Actual horsepower of engines employed	313	1,238	64	862	185	3	2,665
Approximate value of land and buildings	$487,793	$783,409	$20,196	$325,987	$138,524	$487	$1,756,390
Approximate value of plant and machinery	$177,598	$906,580	$34,722	$383,496	$74,399	$1,460	$1,578,253
Total amount of wages paid during year	$340,792	$1,178,462	$47,680	$543,281	$159,495	$1,416	$2,271,126
Value of fuel used	$13,684	$82,078	$2,004	$34,949	$12,605	$147	$145,467
Value of material worked up	$1,341,354	$1,354,264	$70,064	$556,815	$321,798	$1,456	$3,645,751
Total value of output	$1,888,074	$3,108,850	$157,459	$1,312,216	$409,358	$4,243	$6,880,200
Value added in process of manufacture	$546,720	$1,754,586	$87,395	$755,401	$87,560	$2,787	$3,234,449

The phrase "new protection," although novel, has considerable importance in Australian economic matters. Its interpretation is that a manufacturer who benefits by the Commonwealth's protective tariff should charge a reasonable price for the goods he manufactures, and should institute fair and reasonable wage rates and working conditions for his workmen. By the customs tariff of 1906 increased duties were imposed upon certain classes of agricultural machinery, notably stripper harvesters, and at the same time an excise tax of one-half the duty payable upon imported agricultural machinery was imposed upon similar machinery manufactured in Australia. It was provided, however, that the latter should be exempt from excise if the manufacturer agreed to produce the goods under conditions that, by resolution of both Houses of Parliament, were declared to be fair and reasonable, and that conformed to the terms of an industrial award under the Commonwealth conciliation and arbitration act and the terms of an industrial agreement filed under the excise tax act. Exemptions under this excise provision have been claimed by the manufacturers of agricultural machinery in South Australia, New South Wales, Victoria, and Tasmania. These were granted in the two first-mentioned States in consequence of an agreement entered into between the employers and employees. In Victoria "this whole controversial problem with its grave economic bearings" (to quote the words of the president of the court), was discussed in a lengthy case, now widely known in Australia as the "harvester case." The exemptions claimed were refused, and the court, after discussing the meaning of the words "fair and reasonable," defined them by laying down what is considered to be a scale of fair and reasonable wages. The high court has pronounced, however, that the legislation under these excise acts is unconstitutional as being an extension of federal action beyond the powers granted and a usurpation of the ground reserved to the States. At any rate, however, as will be seen by the duties levied on imported agricultural machinery, the manufacture of this class of goods in Australia is highly protected, to which fact the expansion of the industry in recent years is largely to be attributed.

The foregoing statistics of agricultural machinery manufacturing in Australia indicate the numerous industrial establishments engaged in the production of that class of goods. The number of factories turning out farm machinery upon a large commercial scale, however, probably does not exceed 20. Some of these are rather large undertakings, equipped to supply a most excellent product. These larger establishments, moreover, produce machines that to a large extent have become standardized. With the protection afforded by the tariff they not only have been able to compete with imported goods but are making more and more difficult the introduction and sale of imported lines. The trade in stump-jump plows, for instance, is practically a monopoly of the local manufacturers, and until the advent of the reaper-thrasher, most of the grain-harvesting machines, other than binders and reapers, were locally made. The large drill trade is increasingly passing into the hands of local manufacturers, as shown by the statistics of imports. American drills served as the foundation type of those made locally, but a number of improvements have been incorporated in the latter to make them better suited to the conditions prevailing in Australia. Gas engines and tractors are beginning to be produced by local manufacturers. Winnowers, chaff cutters, corn shellers, strippers, and one-way disk cultivators can be said to be entirely supplied by local manufacturers. Nearly every machine used extensively in Australian farming is made locally in increasing quantities.

The future of farm-machinery manufacturing in Australia is largely dependent upon the Government's policy concerning the tariff and upon the attitude of the labor unions. Of late years the cost of production has considerably increased owing to higher wages, shorter working hours, and smaller output per worker. This is shown by the figures for the past six years. The highest point of development was attained in 1911, and, considering that Australia had more than 3,500,000 more acres under crop in 1914 than in 1911, it is apparent that the local manufacturers have fallen behind in the proportion of the farm-machinery requirements of the country that they have supplied. One obtains a clear comprehension of this when visiting the country. When the figures for 1915 and 1916 become available a further decrease in the local production will doubtless be seen, in spite of the good progress made by agriculture in general during that period. So far as can be ascertained, labor conditions are chiefly responsible for this retrogression, although the war, the number of men taken away from the factories, the shipping difficulties, the inability to obtain adequate supplies of material, and (not the least important element) the severe drought of 1914–15, are also factors that have greatly interfered with the progress of this industry.

OPPORTUNITY FOR AMERICAN MANUFACTURERS TO SUPPLY MACHINES AND PARTS.

Local manufacturers make no attempt to disguise the fact that labor conditions in Australia have become so unsatisfactory as to imperil the future of their business. Finished parts, castings of many kinds, and other semifinished materials, which at one time were largely made locally, have recently been imported in larger quantities from the United States and England. Some of the manufacturers indicated to the writer that they might consider discontinuing the manufacture of certain lines if they could satisfactorily arrange to obtain these from the United States. It should be understood in this connection that, as a rule, Australian manufacturers act also in the capacity of retail distributers of farm machinery in general. What is desired is that American manufacturers should undertake to build machines in exact accordance with the specifications furnished by Australian manufacturers, and that the former should not supply or offer these to other concerns in the Commonwealth. Australian manufacturers would, of course, expect to obtain these machines at a lower cost, if anything, than that at which they have been able to build them themselves. The profits of the American manufacturers taking up this business might not be large, but, considering the possible importance of the orders and the fact that the articles could probably be built during the slack season, it is not unlikely that the results would be rather satisfactory. This trade should appeal especially to those American manufacturers who are chiefly interested in supplying the jobbing trade. In endeavoring to secure some of this business it will be necessary to keep in mind that a certain amount of reluctance will have to be overcome before the Australian manufacturers likely to be interested will signify their readiness to disclose confidential data, such as the specifications and character of the machines to be built—data that are necessary to enable American firms to furnish estimates. It is obvious also that they will desire to avoid giving the impression that their position as manufacturers is becoming precarious, since this might stimulate foreign competitors to greater activity in the sale of goods in Australia. It is to be assumed, therefore, that it will require considerable tact to induce them to disclose their willingness to discuss a proposition of this nature and that they will have to become fully convinced of the interest and good faith of the American manufacturer before they will be disposed to enter into negotiations.

In view of these circumstances it would appear to be useless to take up such a matter by correspondence. It is believed that the only feasible plan would be for interested American manufacturers to go to Australia or to send capable representatives to obtain this business. A careful survey of conditions leads the writer to believe that it would be worth while for manufacturers desirous of establishing connections of this character to proceed along the lines suggested. Their success would be more certain if they should be willing, in certain cases, to supply only the principal parts of the machines, especially when it appears that the Australian manufacturer (owing to cost of production or other reasons) can more economically manufacture the rest of the machine. It should be understood that such machines would quite probably be sold as the product of Australian factories; therefore it would probably be required that the name of the American manufacturer should not appear in connection with them.

Conditions in Australia are such, however, that it is very difficult to give specific advice to American manufacturers with regard to matters of this kind, for increased activities on their part in supplying the Australian trade may cause the Commonwealth to raise the tariff to safeguard the local industry from foreign competition. It is almost certain that the labor unions would support such a measure.

WESTERN AUSTRALIAN GOVERNMENT IMPLEMENT WORKS.

The State Implement Works established by the government of Western Australia in 1912 manufacture farm machinery and implements. The desire to cause the importers to reduce the prices of farm machinery is said to have been the chief reason for this undertaking. Western Australian farmers doubtless pay higher prices for their implements than is the case almost anywhere else, but it can not be said that the private firms engaged in the business are responsible for this. Freights from the United States and England to Western Australia are higher than those to other nonmanufacturing farm-machinery countries. The longer time required for the goods to reach destination, the high duties levied on them, and the very long terms of payment given to farmers are important items of expense that must be considered.

After nearly four years of existence the State Implement Works have failed to cause lower prices for farm machinery or to attain economic success. The government has lately signified its intention to reduce operations to a minimum and to sell the works when a favorable opportunity presents itself. The capital involved in this undertaking amounted to $1,456,343 in 1916, and prior to that year no interest on this was debited to the works. The accounts for 1915–16 show that a total loss of $128,870 was incurred that year in operating the plant.

The original equipment and machinery of the works comprised that of two implement factories forced into liquidation. One of these, located in South Australia, manufactured tillage implements, and the other, located in Victoria, made harvesting machinery. The price paid for this machinery and equipment is said to have been about one-half the market value at the time of the original purchase—which makes more significant the want of success attending the operations of the works.

The factory is located at Rocky Bay, a suburb of Freemantle, and covers 8 acres of land. It is well provided with railage and river facilities, and heavy and bulky material is generally handled by means of barges. The machinery used and methods of manufacture are fairly up to date, and the product turned out invites favorable comparison with imported and other local goods. As is the case in many other Australian implement factories, a great deal of handwork is done—this being necessary because of the relatively small output of several lines and the custom of furnishing such equipment as may be desired by the farmers, instead of adhering to a standardized product. The value of the implements sold by the works in 1914 was $27,660, in 1915 $184,450, and in 1916 $360,555. The machines manufactured during the season 1915–16 included 240 disk cultivators, 160 other cultivators, 130 stump-jump moldboard plows, 38 stump-jump disk plows, 70 fertilizer drills, 37 windmills, 53 chaff cutters, 202 sets of stump-jump harrows, 150 rakes, 70 winnowers, 78 strippers, and 300 stripper harvesters. It should be taken into account that all the machines enumerated were of large sizes, such as are used in Australia in growing wheat under extensive methods of farming. For the following season it was intended to reduce the number of lines and to produce chiefly 300 stripper harvesters and 60 strippers. No other concern in Western Australia is equipped to produce steel and malleable castings. A few outside lines, including an American binder, are imported and retailed in conjunction with the manufactures of the works.

In July, 1914, 150 men were employed, and 618 a year later. At the time of the writer's visit to the works (October, 1916) 255 men were employed. The minimum wage in 1914 was $2.25 per day, paid to assemblers, laborers, and blacksmith helpers. The highest wage was $3.35, paid to patternmakers and blacksmiths. Drillers are paid $2.50, machinists $2.75, and fitters $3 per day. There has probably been a pronounced increase in wages since that time. Eight hours constitute a working day, and the hours are so arranged that the workers have Saturday afternoons off. Some difficulty was experienced at first in obtaining competent foremen, but this has since been overcome. The management of the works has fostered various activities calculated to improve conditions; social gatherings take place occasionally, a band has been organized, and a fire brigade and ambulance corps are maintained. A course of apprenticeship of six years' duration is given at the shops, the wages earned being $3.75 per week the first year and gradually increasing to $15 per week in the sixth year. Arrangements have been contemplated to enable apprentices to attend instruction at the Government's technical schools.

It is understood that several other States have instituted inquiries as to the progress of these works, with a view to considering the establishment of similar enterprises. Owing to the unprofitable experience of the Western Australian works, it is doubtful whether State ownership of implement works will be sanctioned by the taxpayers of the other States of the Commonwealth.

EXPORTS OF AUSTRALIAN-MADE AGRICULTURAL MACHINERY.

The following table gives the value of the exports of agricultural machinery manufactured in Australia during the past five years:

Years.	Stripper harvesters.	All other machines.	Total.
1911	$424,621	$144,248	$568,869
1912	496,383	201,535	697,918
1913	791,779	169,592	961,371
1914–15	....	77,265	77,265
1915–16	75	131,092	131,167

With the exception of a few stripper harvesters shipped to South Africa, all the machines of this type exported by Australian manufacturers go to Argentina. Various causes, such as shipping difficulties, unfavorable agricultural and financial conditions in Argentina, and the advent of the reaper-thrasher in the United States and Canada (which has undoubtedly been offered to the Argentine importers as a better machine) have combined to deprive Australian manufacturers of the excellent and growing trade they had created in that country, and, owing particularly to the cause last mentioned, it is extremely doubtful whether they will ever again participate in the trade of Argentina.

Plows (chiefly disk plows) and harrows largely constitute the machines grouped in the second column of the above table. South Africa, the Pacific Islands, and New Zealand are the chief countries to which these goods are exported. While Australian manufacturers will probably continue to supply that trade, it is not believed that they will succeed in increasing it.

SYSTEM OF CONDUCTING TRADE.

The agricultural machinery business of Australia is chiefly done by the local manufacturers and by several importers, who almost invariably sell the machines directly to the farmers. The largest firms maintain branches in all the capital cities of Australia—namely, Sydney, Melbourne, Adelaide, Brisbane, Perth, and Hobart. In a number of smaller towns (see p. 12) smaller firms are also engaged in the implement business, either as agents for the domestic manufacturers or as direct importers. These concerns are so few, however, that the statement that all the business is done from the capital cities and directly from importer or manufacturer to user can be accepted as literally correct. Neither country firms, therefore, nor branches of the local manufacturers or importers are to be found in the interior agricultural centers of Australia.

Commission agents, however, are to be found in the rural districts. As a rule these are widely known farmers or, to a less extent, country storekeepers; in neither case do they carry stocks of machines, and they are seldom provided even with stocks of repair parts except, in a few cases, such standard parts as plowshares, disks, binder knives, guards and sections, stripper combs, and the like. The principal and almost the sole function of these agents is to keep the manufacturers or importers they represent advised concerning the prospective needs of the neighboring farmers. In a few cases they may also effect sales and start the machines they have sold. All these transactions are always performed in the behalf of the houses they represent, and in no case do they take any financial or other responsibility. In compensation for their services they are paid a commission ranging from 5 to 15 per cent, according to the character of the service they have rendered. It appears that in the majority of cases a commission of 10 per cent is paid to them. The severe competition of former years is said to be chiefly responsible for the present existence of these commission agents, and there appears to be an increasing feeling that they occasion an unnecessary expense with which the implement houses could easily dispense if all of them agreed to discontinue the practice.

The largest Australian manufacturer and the Australian branches of the two American and Canadian firms referred to on page 69 control possibly 65 per cent of the entire implement trade. These three firms have been established for many years. Their large resources, together with the application of progressive merchandising methods, have enabled them to create selling organizations so effective that the existence of other houses in the implement business has become rather precarious—so much so that a number of firms have gradually given up their interest in that trade. For this reason no new firms have taken up the sale of farm machinery in recent years, nor are any likely to do so as long as present conditions prevail. Under such circumstances the average American manufacturer will find it extremely difficult to build up a large business in Australia. The establishment of branch houses offers the only alternative, yet this procedure would involve such an outlay of capital that it can not be considered advisable unless some exceptional circumstances are involved. The practice of selling goods directly to farmers and giving them extended terms of payment (as is often done) forms one reason for cautioning American manufacturers against entertaining such a project.

Half a dozen other manufacturers are also important factors in the distribution of farm machinery in Australia, and some of these maintain branches in two or three of the largest implement centers of the Commonwealth, such as Sydney, Melbourne, and Adelaide. Otherwise they dispose of their goods through large merchants in the other capitals of the country. It may be roughly figured that these six local manufacturers do about 20 per cent of the trade.

The remaining 15 per cent of the business is done by the other Australian importers and by the smaller local manufacturers, who, with a few exceptions, are of rather slight importance.

Some of the more standard lines of farm machinery, with which all farmers are more or less acquainted and which they are willing to buy without expecting the sellers to start them or to furnish other field service and assistance, are sold by some of the largest general-merchandise houses of Australia. These sales are generally effected by means of catalogues and with the assistance of travelers, who, being interested in the sale of all types of merchandise, are not expected to know a great deal concerning farm implements. They are made in some cases on a wholesale basis to general storekeepers. The articles comprised in transactions of this character are chiefly walking plows, disk harrows, mowers, and such other machines as are largely sold in closely settled areas and are not likely to prove difficult to handle.

PRICES.

A number of circumstances have combined to cause very high prices for farm machinery to prevail in Australia. The cost of ocean freight; the length of time required for foreign goods to reach the country; the high rates of duty paid by imported goods; the effect of the labor situation on domestic manufacture; the large selling expenses in a country where distances are great and the farms, being relatively large, are widely scattered; the fact that, because of the lack of country implement dealers, the importers are compelled to employ high-salaried salesmen to seek the farmers' business; and the keen competition, which causes the importers to try to excel each other in the matter of service—these, among other things, are the factors responsible for the high prices that the Australian farmers have to pay for their farm machinery.

Prices have changed so frequently during the past three years that no prices will, as a rule, be given in the subsequent parts of this report, where the demand for the machines more largely used in Australia is individually reviewed and discussed. To substantiate the statement that extraordinarily high prices for farm machinery prevail in Australia, the following prices are quoted as applying to the goods sold for the season 1916–17. These may be considered as only 10 to 25 per cent higher than those in force before the war, for the Australian merchants ordered the goods in the early part of 1916, before the prices had been materially advanced by the manufacturers. They are also to be understood as being the cash prices quoted by the importers to the farmers themselves:

	Weight in pounds.	Price.
7-inch walking plow, steel beam and handle, without any extras	60	$12.00
2-furrow riding plow, no eveners	700	90.00
2-disk plow	1,000	85.00
12-disk harrow with forecarriage, no eveners	675	70.00
5-tooth horse hoe	85	12.50
20-tooth (spring) riding harrow with two poles, steel wheels, and forecarriage	900	115.00
13 by 7 fertilizer disk drill	1,350	225.00
6-foot left-hand binder with sheaf carrier and transport truck	1,875	245.00
6-foot stripper harvester	3,000	500.00
4½-foot mower	700	90.00
8-foot 30-tooth self-dump rake	335	55.00
Side-delivery rake	800	150.00
14 by 18 baling press, one horse, hand feed	2,100	250.00
4-horsepower horizontal stationary gas engine, hopper-cooled, with magneto	1,000	375.00

Owing to the highly competitive character of the business, it is not to be inferred that the prevalence of the high prices quoted above means that the farm-machinery merchants are making large profits. On account of the high duty paid by this class of goods, the importers are not believed to make anything like satisfactory profits, except in the case of the one or two most successful firms in the business. There have been a few failures among the Australian manufacturers in the past, but it is believed that, when the business is carefully conducted, the profits made by them have been, on the whole, quite satisfactory. The largest manufacturers, in particular, convey the impression that their business is highly profitable and successful.

TERMS OF SALE AND PAYMENT.

Australia has long been known as a country in which long credits are given in the sale of farm machinery. While this, in general, is the case, the practice does not prevail to the extent commonly believed. Several of the largest firms in the business have concurred in the opinion that at least 60 per cent of the agricultural machinery sold in the country is paid for within the year of its sale. On the other hand, the goods not paid for on this basis are generally subject to long credits, as evidenced by the following terms at which some of the merchants offer them for sale (these are taken from the contracts of several importers and are such as prevailed during the 1916–17

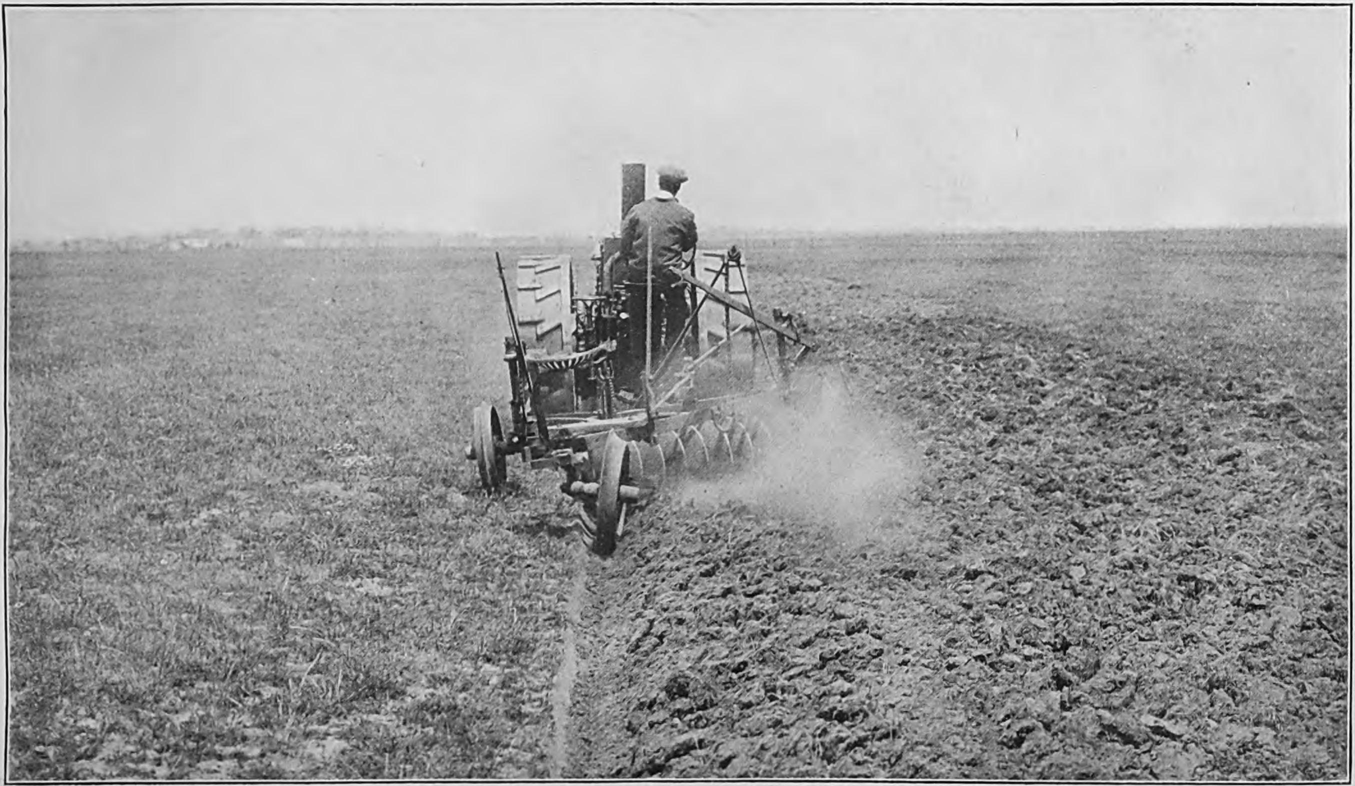

FIG. 7.—KEROSENE TRACTOR AND ONE MAN PLOWING UP A BIG PADDOCK NEAR HAWKESDALE, VICTORIA.

season): Walking plows, one-horse cultivators, lever harrows, hand corn shellers, and similar small machines.—One-half cash and one-half January 2, 1917. Gang plows, including stump-jump and disk plows, disk harrows, riding tooth harrows, land rollers, reapers, rakes, stackers, hay loaders, baling presses, cream separators, large corn planters, mowers, and power corn shellers.—One-third cash, one-third January 2, 1917, and one-third January 2, 1918. Drills.—One-fourth cash, one-fourth January 2, 1918, one-fourth January 2, 1919, and one-fourth January 2, 1920. Binders, stripper harvesters, reaper thrashers, gas engines, and tractors.—One-third January 2, 1917, one-third January 2, 1918, and one-third January 2, 1919.

When machines are sold on such extended terms of payment the sales are made under a contract known as a "hire agreement," to which contract nearly all the Australian merchants adhere with slight variations. According to this agreement the machinery sold remains the property of the seller until fully paid for. The following is a typical sales contract when goods are sold on these terms:

To ——— HARVESTER CO., No. ———
Melbourne,

Please forward to me on hire the following machine or implement, namely:

(hereinafter called "the machine"), to be delivered at my risk at the wharf or railway station at Melbourne, and to be consigned to me to the ---------------------------- railway station, or at your option to be delivered to me from any of your agencies or depots, on or about the ---------- day of ------------------------, 19---. The freight from the said wharf or railway station to be paid by me. Such machine shall be hired and held by me from you for a term until the ---------- day of ----------------------, 19---. (determinable as hereinafter mentioned) on and subject to the terms and conditions following:

1. I shall pay you at your office at Melbourne as rental for the hire of the machine during the aforesaid term the sum of -- (hereinafter referred to as "the said total rental") as follows:

£----------------- in cash on delivery for the period of the hiring terminating 30 days after delivery of the machine.

£------------ for the period terminating on the ------ day of --------------, 191--

£------------ for the period terminating on the ------ day of --------------, 191--

£------------ for the period terminating on the ------ day of --------------, 191--

£------------ for the period terminating on the ------ day of --------------, 191--

£------------ for the period terminating on the ------ day of --------------, 191--

£------------ for the period terminating on the ------ day of --------------, 191--

£------------ for the period terminating on the ------ day of --------------, 191--

£------------ for the period terminating on the ------ day of --------------, 191--

For which respective instalments of rental (other than the cash instalment) I will on delivery give or send to you at Melbourne as collateral security for the payment thereof my duly stamped promissory notes payable to your order at ------------------ Bank of ------------------------------------ at ----------------------------- on the last day of such respective periods of hiring.

I am to be allowed a discount of £---------------- off the said total rental in the event of my exercising the option of purchase contained in clause 6 hereof within 14 days of delivery.

2. If I fail to pay, give, remit, or send to you at Melbourne such cash payment and or promissory notes within 14 days after delivery as aforesaid, or if I at any time countermand delivery or refuse to accept delivery of the machine you are to have the option, by written notice to me, of determining the hiring and treating the transaction as a cash sale to me of the machine in Melbourne for the said total rental (less any amount then paid) which notice may be given to me personally or sent to me by post by registered letter at my postal address hereunder written, and thereupon the said total rental (less any payment as aforesaid) shall immediately become due and payable by me to you at Melbourne, and may be sued for in any court of law having jurisdiction, and the production of this order and proof of the delivery of the machine and of the giving or sending such notice, shall be conclusive evidence of the said total rental (less any payment as aforesaid) being due from me to you.

3. If I shall at any time (after this order becomes binding upon you) prior to the date for delivery of the machine countermand delivery thereof (otherwise than under and in accordance with the provisions of the endorsement hereon, if signed by me), or if after the said date I shall refuse to accept delivery thereof and you should not exercise the aforesaid option of sale, I hereby agree to pay you in Melbourne one-fourth of the said total rental (less any amount then paid) as and by way of liquidated damages.

4. At any time after payment by me of one-half of the said total rental I am to have the option of determining the hiring by returning the machine in good repair, order, and condition to you to the said wharf or railway station (carriage paid by me), and paying to you such further rental as may be due to the date of such determination as aforesaid, in which case the hiring shall be determined, and you shall return to me all promissory notes then unpaid.

5. I will not during the hiring offer for sale or part with the possession of the machine or remove it to any locality distant more than fifty miles from my said postal address without your written consent, and I will not allow the machine to be used or worked by any person or persons other than myself, my workmen, servants, and employees, and I will, during the hiring, keep the machine in good order, condition, and repair, and, when not in use, protected from the weather, and I will indemnify you from its loss by its seizure under distress for rent or other legal process, and also from its loss or injury by fire, accident, or any other means.

6. Until either a breach by me of any of the terms hereof or the occurrence of any other event determining this order and entitling you to immediate possession of the machine I am to have the option at any time during the hiring of purchasing the machine by paying to you the difference between the amount I have then actually paid and the said total rental, and you shall thereupon return to me any current promissory note or promissory notes.

7. If I shall fail to comply with or perform any of the provisions hereof, or if I shall, during the hiring, sell or attempt to sell, or shall part with or attempt to part with the possession of the machine, or if I be now an uncertificated insolvent, or if I shall become or threaten or attempt to become insolvent, or if my estate become sequestrated or threatened with sequestration, or if I shall assign my estate for the benefit of all or any of my creditors, or if I shall make a composition with them, or if any rent for the premises whereon the machine for the time being is shall become in arrear, or if any execution be issued against me or my goods or estate, my rights under this order shall be thereby terminated and I will forthwith return the machine to you at Melbourne at my expense in good order and condition, reasonable wear and tear excepted, and you shall be entitled to immediate possession of the machine, and to enter by any person or persons at any time or times, and, if necessary, from time to time upon any land, building, premises, or place where the machine may be and to take back and retain the same as if this order had not been given, and for that purpose to break open and enter any building, premises, or place where the machine may be, of the leave and license to do which this order shall be conclusive evidence in any court; but you shall, nevertheless, be entitled to retain all moneys previously paid in respect of the machine whether by way of deposit or rent for hire or otherwise howsoever, and to receive and recover all moneys herein agreed to be paid for the hire of the machine, and which may be owing or accruing, due and unpaid at the time of such return or seizure.

8. In the event of your inability to supply the machine through industrial disputes or disturbances, accident, fire, nonarrival of shipment or customs or any other seizure or detention or through any other reasonable cause, this order shall be and be deemed to be cancelled as from the date of the happening of any such event or casualty, and you shall be under no liability in respect thereof.

9. Until I shall have paid the whole of the said total rental I will hold the machine solely as your bailee, and I shall not have any property or interest as purchaser therein.

10. If any of the said promissory notes shall not be paid by me on or at their respective due dates and place of payment, I will pay the amount thereof to you at your Melbourne offices.

11. In the event of a variation or extension of any of the monetary payments or of any of the due dates thereof being agreed to by you during the term of the hiring such variation shall not prejudice or affect any of the other provisions hereof save and except that clause 1 shall be then read and construed so as to accord with such variation or extension.

12. The provisions of the endorsement hereon (if signed by me) and of the warranty (also endorsed hereon) shall be incorporated with and form part of this order.

13. I hereby acknowledge that I have signed this order irrespective of any representations made to me by any of your travellers or agents, and that this order, when accepted by you, or when the machine is delivered, together with such of the endorsements hereon as shall be executed, shall be the only evidence of the agreement between us.

14. If I shall make default in payment of any moneys payable under the provisions hereof the same shall bear interest at the rate of ten pounds per centum per annum until payment thereof.

15. Whenever the context so requires any words importing the singular number shall include the plural.

16. This order shall not be binding on you until received and ratified by you in writing or until the delivery of the machine as hereinbefore provided.

Dated this -------------- day of -----------------------, 191---

--, Hirer.

Postal Address--

Witness--

The merchants' price lists almost invariably show the different prices of the machines in accordance with the varying terms of payment, which the buyer is permitted to select. For example, a 13 by 7 fertilizer disk grain drill is sold at $215 if paid for in cash; at $230 if paid for one-half in cash and one-half January 2, 1918; at

$243 if paid for one-third in cash, one-third January 2, 1918, and one-third January 2, 1919; and at $257 if paid for one-fourth in cash, one-fourth January 2, 1918, one-fourth January 2, 1919, and one-fourth January 2, 1920. As a rule, 9 to 10 per cent interest per annum is charged when such credits are given. Settlements are generally made by promissory notes given by the purchaser at the time the machinery is delivered to him.

While the Australian farmers often purchase their machinery on extended terms of payment, they are considered, on the whole, as good credit risks, and the interests of the seller are further safeguarded by the "hire agreement" referred to. It has been said that such long credits could be considerably curtailed if the merchants would agree to make adequate efforts in that direction. It was indicated in some quarters that wealthy capitalists are often connected with the firms devoted to the sale of agricultural machinery, enabling them to give the long credits. The further statement was often made that it would be difficult to find in Australia a more profitable and safe means of investing money than by taking over the promissory notes given by farmers when effecting purchases, considering the satisfactory interest charged and the methods adopted to safeguard the interests of the merchant.

The smaller houses (and these are the ones with which most American manufacturers do business) are in certain cases at a disadvantage in meeting the requirements of the trade in this respect, and they would welcome any assistance that the manufacturers might extend to enable them to obtain the larger share of the trade that they could secure if placed in a position to meet the practices of the larger firms in giving such long credits. It is claimed that the manufacturers would benefit if, instead of insisting on selling the goods on the basis of payment f. o. b. New York, they were to agree to ship their goods on more liberal terms—say 90 days' sight drafts. The importers would be prepared to pay an adequate rate of interest for the time of the credit, and, since they would be able to get the orders that they sometimes must give up owing to their inability to give the farmer the terms that other houses are ready to give him, they would sell a greater number of machines, which in turn would mean greater orders for the manufacturers.

In discussing this subject several merchants expressed doubt as to whether American manufacturers realize that the cost of ocean freight and the duty on imported goods often amount to more than 50 per cent as much as the f. o. b. value of the goods at point of embarkation in the United States—in other words, that when $5,000 worth of goods are shipped by an American manufacturer to an Australian firm the importer will have to pay $7,500 before the goods reach his warehouse. In the case of harvesting machines and several others, furthermore, all these expenses incident to the importations occur when the importer's collections are lowest, since the farmers are in the midst of their agricultural operations, and his expenses are highest, since he has to maintain a large number of salesmen and machinery experts in the field at that season of the year.

VI. MARKET FOR PARTICULAR LINES OF EQUIPMENT.

PLOWS.

The plows used in Australia in connection with wheat growing (which, as stated elsewhere, is the most important agricultural industry of the country) have several distinctive features seldom embodied in American plows or in those of other countries. The fact that stumps and roots are not systematically taken off the land where wheat is grown makes it necessary that the plows should be provided with some device whereby they will suffer no breakage or other damage when the bottoms encounter such stumps and obstructions.

The question of constructing plows to meet the requirements in this respect has from time to time received a great deal of earnest consideration on the part of several American manufacturers. In every case, however, the peculiarities of the demand and the marketing conditions prevailing in Australia have caused them to regard the prospects of success as altogether too uncertain to justify their taking up the actual manufacture of plows of that type. One of the chief deterring elements may be found in the fact that the local manufacturers still largely adhere to the practice of catering to the whims of individual users. This operates against the sale of the standardized stump-jump plows that American manufacturers might advantageously supply. It is not uncommon, as a matter of fact, to find that local manufacturers advertise that "all classes of plows are made to order." One of the leading plow manufacturers of Australia stated that if different types, sizes, and particular equipment were considered, his factory could display more than 500 plows, every one more or less different from the others. Obviously, so long as such conditions prevail American manufacturers can not hope to secure a share of the stump-jump plow trade of Australia. This would be desirable otherwise, for, owing to the large amount of hand work done on the locally made plows, the farmers are accustomed to pay high prices for them, considering the amount of material used in their construction and the fact that many parts of one kind are used in every plow (since the bulk of the demand is for plows with three, four, and five bottoms). If it were possible, therefore, to manufacture them in accordance with the large-production methods that obtain in American factories the farmers could purchase them at lower prices and still leave a very good margin of profit to the manufacturer.

It is widely admitted that there is no good reason why the local manufacturers should produce so extensive a range of types, and that this practice is due more to precedent than to actual necessity. Believing this to be the case, one of the largest American farm-machinery manufacturers recently conducted a systematic investigation and study of the factors bearing upon the plow trade of Australia and arrived at the conclusion that, in all probability, the number of Australian farmers who could be induced to take up the use of standardized plows would be sufficiently large to justify the construction of a limited line of plows to suit at least the average requirements. It must be carefully noted that the American firm mentioned has its own retailing branches throughout Australia and, therefore, it does not follow that its success should encourage other American manufacturers to follow the example. American manufacturers without their own retail sales organization in Australia (who consequently would have to depend on the local importers to sell their plows) are not recommended to take up the construction of stump-jump plows without first giving careful consideration to the many disadvantages that they would have to overcome to make a success of the undertaking. In general, a study of the market strongly suggests that American manufacturers will do well to look askance upon the manufacture of plows of that type.

In the districts that have been settled for a relatively long time, where after a few years of cultivation with stump-jump implements the inert stumps and roots have become loose, so that the farmers can take them off the land by simply picking them up, the regular types of plows are generally used. In such districts American disk plows, and to a smaller extent moldboard plows, have been used for many years. However, the competition and increasing ability of the local manufacturers, aided by a duty of 25 per cent, has made it more and more difficult for our manufacturers to retain the trade that they once had. A good trade is still done by several American manufacturers of disk plows, but their future is both uncertain and precarious, being largely dependent on the turn that labor conditions may take in Australia in the next few years.

Moldboard plows for orchards, truck farming, and mixed farming, with one or two bottoms, are also sold by American manufacturers in appreciable quantities, but the trade for larger moldboard plows, with three, four, and five bottoms, which is much the largest, is largely supplied by the local factories. The size of the shares, and the long turning English or "colonial" moldboards (which are preferred by the Australian farmers and which are made in the United States only by one or two manufacturers), account for the small American trade in plows of this type.

Wherever land is irrigated—chiefly in districts of New South Wales and Victoria and also parts of Queensland and Tasmania—American walking plows, and other plows of sizes smaller than those generally used on the wheat farms, are also sold in relatively large numbers.

One should not lose sight of the fact that a duty of 30 per cent is paid on imported stump-jump plows and of 25 per cent on all the other plows. This is undoubtedly a severe obstacle to the sale of imported plows. That, on the whole, the trade in imported plows is altogether unimportant is shown in the statistics given on page 65, where the group of machines in which plows are included shows an average annual importation valued at $635,000. It is not improbable that if the value of plows were given separately it would be found that the annual importation of these amounts to less than $300,000, of which the share of the United States is probably about $200,000. These figures speak for themselves as to the present unimportance of the Australian market for imported plows.

The difficulties of the Australian implement market are such that it is rather discouraging for American exporters and Australian importers to attempt the introduction of certain types of plows which, it may be felt, would be found suitable for that country. This condition is likely to operate against the increase of the American plow business there, though there is much reason to believe that if an earnest attempt were made to introduce the high-grade American foot-lift plows so extensively used in our Middle Western States, it would meet with success. As stated elsewhere, a great deal of the field work is done by the actual owners of the land, and where such plows could be used—that is, in the districts where stump-jump plows have ceased to be a necessity—the farmers are sufficiently well-to-do to be able to afford implements with features making for comfort and ease of operation, such as are found in the plows in question. A modest beginning in this direction has been made by a few American manufacturers, and they are recommended to support their agents in any measures tending to promote the effective demonstration of the advantages of these plows.

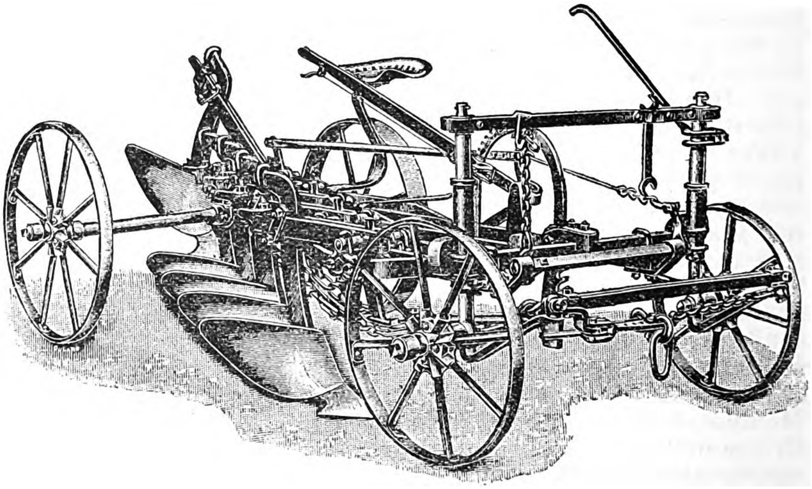

Fig. 8.—Five-furrow stump-jump moldboard bridle-draft plow (rear bottom jumping), made in Australia.

Deep plowing is seldom practiced in preparing the land for ordinary crops. As a rule, plowing for wheat is done 4 or 5 inches deep, and except in the case of sugar-cane lands, which may be plowed up to 10 and 12 inches, plowing for any crop is seldom done deeper than 8 inches. In spite of this, plows should generally be strong and well built on account of the rough nature of the land and the preference of the Australian farmers for substantially constructed plows corresponding in this respect to the heavy machines made in England. The extensive character of the farming operations, the natural dislike for machines that may break down when in use, and the delay and inconvenience involved in the making of repairs, also account for the demand for plows of ample strength, constructed carefully of good materials. With Australian farmers the question of price is generally a consideration secondary to that of quality, and those interested in that market will do well to keep this in mind.

STUMP-JUMP PLOWS.

The need of plows that would make possible the growing of crops in lands from which the stumps and roots had not been taken off led to the invention of the stump-jump plow in Australia many years ago. It is hardly to be conceived that without its advent the cultivated area of Australia would be as large as it is to-day.

These plows are built in so many different styles that an extended description will not be attempted, particularly since it is so extremely doubtful whether American manufacturers should be encouraged to undertake their construction. Only an outline of their most distinctive features will, therefore, be given.

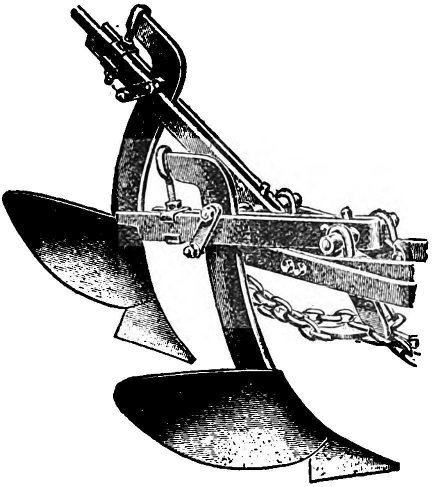

Fig. 9.—Stump-jump in operation.

Stump-jump plows are made of both the moldboard and the disk type. The stump-jump feature is incorporated in their construction by what is known as the "bridle draft" or the "spring release." The former is generally adhered to in the case of moldboard plows, whereas the latter is more generally found in disk plows. When these plows are used for regular plowing—that is, not fallowing or paring—moldboard plows are oftener used, it being claimed that these are preferable because their work upon the fields causes the stumps to become looser than when disk plows are used, while, at the same time, they cut nearly as many roots as the disk plows. In some of the newly settled districts, disk plows, on the other hand, seem the more popular, perhaps, because the question of cutting as many roots as possible is then more important than to loosen the stumps.

Bridle-draft stump-jump plows are so called because the plow bottoms are kept in a working position by means of a bridle arrangement consisting of a chain fastened to an arm attached to, and projecting from, each plow standard, with the other end of the chain connected to an equalizing bar to which all such chains, one for each bottom, are connected. These chains have enough play to allow each separate bottom to jump without interfering with the work of the others. An arrangement whereby the equalizing bar automatically resumes its normal position causes enough pull to be exerted upon the chains to put back immediately into a working position any of the bottoms that may have jumped at the contact with stumps or other obstructions. The standards are so constructed that the pressure required for the bottoms to jump is regulated to suit different classes of land—stony, hard, soft, etc.

In the spring-release type a spring is used to allow the plow bottom to trip upward, whereas the pressure of the spring automatically puts the moldboards or disks into their normal working position when the stump has been passed over. In general this arrangement is not dissimilar to the spring trip as used in cultivators, with which all implement manufacturers are familiar.

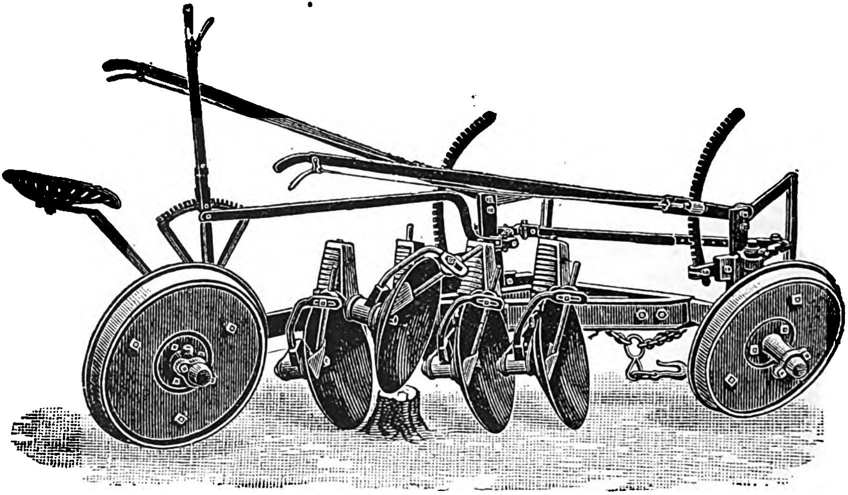

FIG. 10.—Four-furrow stump-jump disk plow, spring release (third disk jumping), made in Australia.

Moldboard plows are made with three, four, five, and six bottoms. The bottoms—that is, the share, moldboard, and landside—are altogether different from anything made in the United States. The moldboards are very short and so shaped that they sharply kick over the soil. This is considered advantageous, so as to break and pulverize the soil as much as possible during the plowing. The shares are made to cut either 7 or 8 inches, and in a few cases a little wider. Nearly every local manufacturer makes a very extensive variety of bottoms to suit divergent requirements and conditions.

Disk plows are made with two, three, and four disks, but in some cases much larger plows are manufactured on special orders; this is also true of moldboard plows. They generally have a jumping range of 12 inches. In some cases plows are constructed in which moldboard or disks will interchange in the standards or frames.

The present demand can be said to be entirely supplied by the local manufacturers. A Canadian firm, which probably has the most complete and extensive organization to be found in Australia for the sale of agricultural machinery, started the manufacture of stump-jump plows a good many years ago. The difficulties encountered as a result of the diversified demand have been such that little progress has been made in the sale of that product. The stump-jump plows that the firm sells in the course of a year probably number fewer than 100. Owing to the complexity of the demand, few of the local merchants handle stump-jump plows at all, preferring to leave that trade in the hands of the local manufacturers. Probably no fewer than 100 different firms manufacture stump-jump plows in Australia, even though the great majority of them have a production of only a few dozen plows per annum. Every district seems to have its peculiarities in connection with these machines, and the small local manufacturers seem to be the only ones who can satisfactorily supply the demand.

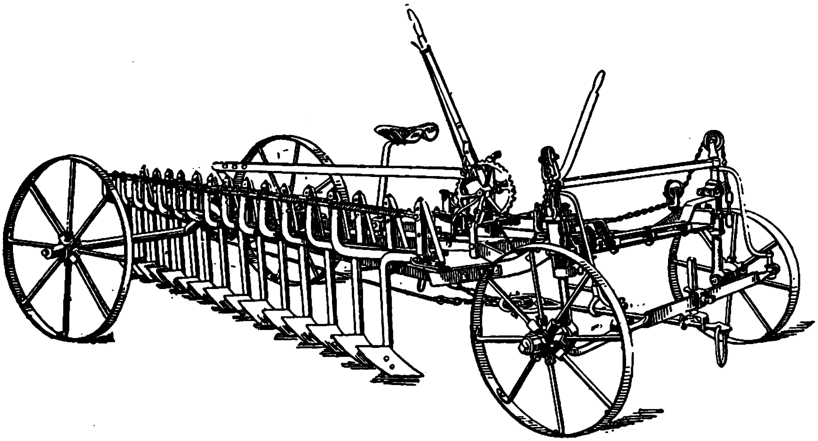

FIG. 11.—Fifteen-furrow stump-jump fallowing plow, spring release, made in Australia.

STUMP-JUMP FALLOWING PLOWS.

For working land in fallow and for light plowing a large number of stump-jump plows of both the disk and moldboard type are used. These are of much lighter construction so far as the individual bottom units are concerned, whereas they are constructed with a much larger number of bottoms, namely, 8, 10, or 12. No attempts have been made to manufacture these fallowing plows outside of Australia, nor is it advised that this be done. The problems to be confronted are similar to those connected with stump-jump implements in general.

DISK PLOWS.

Especially in the eastern sections of Australia—New South Wales and Queensland—a good many disk plows are sold every year. The trade is well divided between Australian, American, and Canadian manufacturers, there being also some English plows sold. The local manufacturers have made considerable efforts in recent years to increase the demand for their disk plows, and the impression gained in the course of the writer's investigation was to the effect that the foreign manufacturers will find it more and more difficult to compete with them.

Disk plows are generally recommended for soils believed to be too hard for moldboard plows, and they are used also in lands with a certain amount of stumps. Strength, therefore, is an important element, and when this is combined with simplicity of construction and operation the principal requirements of the trade are met.

While plows with three disks seem to be the most popular, various merchants carry in stock plows having from one to six disks. In the sugar-growing districts of Queensland and New South Wales single-furrow disk plows are in greater demand than any other size. American plows are very popular in connection with that crop. The demand for plows larger than three disks is not large.

The best features in disk-bearing construction should be provided in disk plows for Australia. Grease cups, ball bearings, and dust-proof boxes are features that intending buyers most closely examine. The disks should be adjustable to plow various widths and also to change their pitch to handle different classes or conditions of soil. The land wheel is preferred when it can be set in or out as required. Heavy and wide wheels are also insisted upon, the furrow wheels being often supplied with 4-inch flanges and the rear wheel particularly heavy to assist in keeping the disks on the ground. A number of disk plows for clay soils are supplied with V-shaped wheels. The scrapers should imitate the action of a moldboard and be adjustable to handle different soils, in addition to being substantially constructed. Levers should be equipped with assisting springs and so constructed that they will be of the proper length when the number of disks in the plow is increased or decreased—a feature that is often an important consideration when a farmer buys a plow of this kind. The draft tongue or hitch should be so constructed that it can be moved along the frame or main beam to balance the draft of the plow.

As a rule these plows are supplied with 24-inch disks, but 26 and 28 inch disks are also often required, particularly in the sugar-cane districts, where disk plows are used almost exclusively. Australian manufacturers often furnish 23-inch disks with their plows as regular equipment, and in some sections there is a demand for 20-inch disks.

Reversible disk plows are used in fairly large numbers in Queensland and to a smaller extent throughout Australia. Several local manufacturers are now building this type. They are ordinarily equipped with 24-inch disks, but 20-inch disks are wanted in some districts.

The question of eveners is one concerning which there should be a distinct understanding between manufacturer and importer, for in some cases no eveners are supplied with this class of plows.

RIDING GANG PLOWS.

The most popular riding gang plow, of the non-stump-jump type, used in Australia is made in two, three, four, and five furrows, although the three-furrow is, perhaps, the most widely used. The most important essential is that these plows must be constructed so as to handle successfully rough and heavy lands.

While the construction of the plows of this kind found in Australia varies considerably, it can be said that, as a rule, they are built with heavy channel steel frames and beams thoroughly braced so as to withstand severe strain. The plow standards are of malleable steel, heavily ribbed, and are secured to the beams in a very substantial way. The furrow wheel is shifted by a lever so that the plow will cut off the whole or part of the front furrow or increase its width to the full turning capacity of the plow, as may be desired. This facilitates keeping the furrow straight. This plow should be adjustable to draw from or to the land when plowing, or at any angle desired when turning at the ends. The rear wheel is a castor one, operated by a foot trip, running at an angle in the corner of the furrow and acting as a landside to the plow. This is an advantage when turning at the ends on a narrow strip of land. When the foot trip is released a plunger engages a ratchet on the axle and the wheel resumes its original position. A land lever, with assisting spring, is provided to enable the operator to regulate the depth of plowing and also to assist in putting the bottoms into the ground or in raising them. The crank on the land axle is fitted with a cushion spring to take up all shocks and jars when traversing rough ground. The draft clevis should be provided for an extensive range of lateral and vertical adjustments. The levers must be conveniently placed so that they can be easily reached by the operator from his seat, and should have coil springs to make it easier to handle them. The moldboards are of steel, finished with a chilled surface to insure scouring under all conditions.

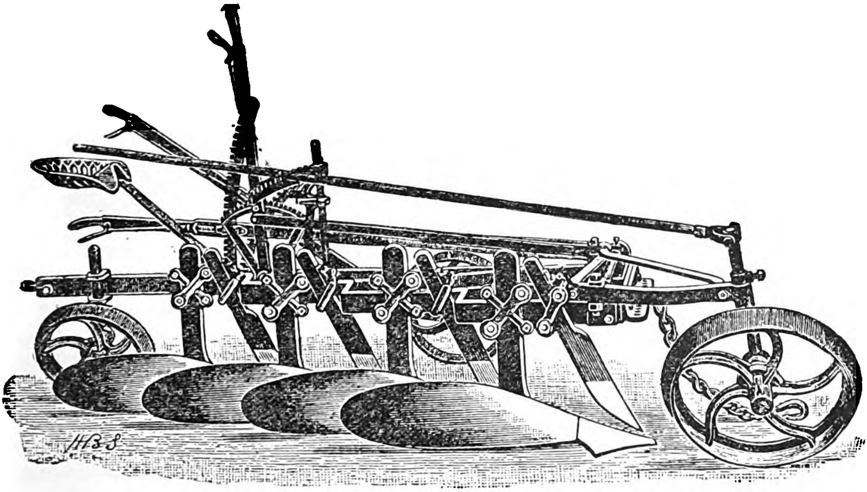

FIG. 12.—Four-furrow riding plow, made in Australia.

Most of these plows are sold with moldboards of the short breaking type peculiar to Australian plows, which also usually have 8-inch shares. Knife coulters and an extra share per bottom form part of the regular equipment. Rolling coulters are provided at an extra cost. The long "colonial" or English type of moldboard is also often supplied for these plows.

Canadian and English manufacturers supplied most of the plows of this type in the early days, and one American manufacturer has also participated substantially in that trade. At the present time the business is passing largely into the hands of the local manufacturers. In many respects, particularly in the construction of the bottoms, this plow is so different from those that American manufacturers produce that, in the absence of means to market them in satisfactory quantities, our manufacturers will probably be reluctant to take up their manufacture. The increasing number used, however, might induce them to offer the other riding plows they manufacture, and possibly to change them somewhat to meet (at least to some extent) the particular ideas of the Australian farmers. The latter may be considered as likely to purchase plows capable of handling satisfactorily the rough and severe work that the type described performs.

The weights of one of the most popular plows of this type are as follows: Two-furrow, 650 pounds; three-furrow, 775 pounds; four-furrow, 950 pounds.

CHILLED WALKING PLOWS.

For truck farming, orchards, potato growing, and similar crops a good many chilled plows of American manufacture are sold in Australia. They are generally supplied with wood beam and handles, although the smaller sizes are often preferred with steel beams. Steel handles are not usually asked for in plows of this type. Plain shares are supplied with the smaller sizes and cutter shares with the larger plows. An extra share is part of the regular equipment. Gauge wheels, jointers, and rolling coulters, as well as knife coulters, are often supplied as extras. Practically the entire demand is supplied by American manufacturers, whose plows are to be seen in use in every State of the Commonwealth. The sandy nature of the soil in most parts of the southern States makes them special favorites in those localities. The sizes most in demand are as follows: Pony plow, with wood handles and wood or steel beam, 9-inch cut, weighing 55 pounds; one-horse plow, with wood beam and handles, 11-inch cut, weighing 70 pounds, with steel beam, weighing 95 pounds; two-horse plow, with wood beam and handles, 11-inch cut, weighing 80 pounds, with steel beam weighing 110 pounds; two-horse plow, with wood beam and handles, weighing 100 pounds, 12-inch cut, and the same plow with steel beam weighing 125 pounds.

STEEL WALKING PLOWS.

Numerous types of steel walking plows are sold in Australia. Local manufacturers produce them, and American, English, and Canadian manufacturers also have a good trade. The American type of plow probably leads all others in popularity because of its lightness of draft and the fact that it sells at more reasonable prices.

All sorts of combinations are in demand, with perhaps 50 different manufacturers sharing in the trade. The bulk of the trade, so far as American plows are concerned, is in plows to cut 10 inches wide, and the demand is rather for the smaller sizes than for the larger ones. To participate in this trade it is necessary to make a good plow in 8, 9, and 10 inch cuts, and in some cases 7-inch cut. Most of these plows are sold by firms engaged in the sale of general merchandise, which includes those farm machines whose sale requires no special knowledge. Possibly for this reason the interest of the regular farm-machinery houses in this trade is not so keen as it might otherwise be, although nearly all of them sell such plows more or less extensively. It will probably be found in some cases that the general-merchandise houses may prove better agents for the sale of these plows than the regular and exclusive implement importers.

It would appear to be only a question of time when the farmers of Australia will abandon the use of the type of walking plow which has been supplied in the past by English manufacturers and the construction of which has been taken up in recent times by Australian and Canadian makers. An indication of this tendency is given by the fact that several Australian manufacturers have undertaken the construction of plows following closely the lines of the American walking plow. The English walking plows have the old-fashioned slow-turning moldboard. The demand for this is still of some importance, but it is worthy of note that its use is confined to those sections of Australia that may be termed the most conservative in adopting modern farm machinery. This, for instance, is largely true of Tasmania, where that type of plow is used almost exclusively. Tasmanian farmers have the reputation, even in Australia, of being rather conservative; this may be partly due to the insular situation of that State in relation to the other sections of the Commonwealth. The American-type plow with general-purpose moldboard is rapidly taking the place of those plows with the English or "colonial" moldboard. In a number of instances importers have thought of making a compromise between the American and the English type, and with this object in view they have ordered in America such plows as are generally supplied to the trade in this country, having them fitted, however, with steel handles about 6 feet long. In some cases American manufacturers have supplied plows that were satisfactory so far as the size of the handle was concerned, but, not properly understanding the purpose, they have not built them of the substantial material

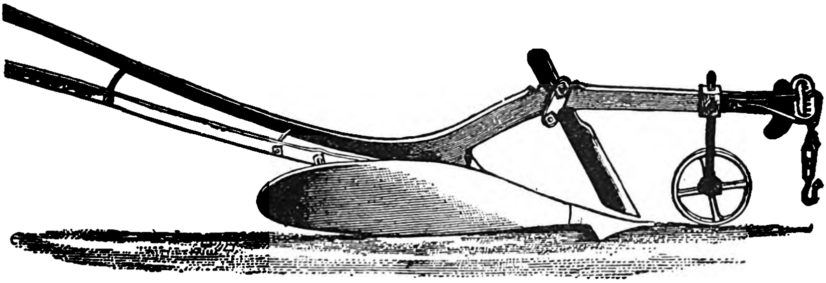

FIG. 13.—Walking plow, made in Australia.

that the importers desired. Since the compromise mentioned is designed gradually to accustom Australian farmers to the American type of plow, it would seem that the makers should take care to supply such handles as will not cause intending purchasers to refuse them on account of their light construction. There is a growing tendency on the part of Australian importers, however, to purchase these plows exactly as manufactured for the United States trade.

WHEEL WALKING GANG PLOWS.

Several types of wheeled walking gang plows are in demand in Australia. They are generally wanted with two bottoms in weights ranging from 250 to 450 pounds. They are furnished with many kinds of moldboards, the preference being for the short moldboard typical of Australian plows, or the long moldboard usually supplied by English manufacturers, both of which are totally different from the moldboards used in the United States.

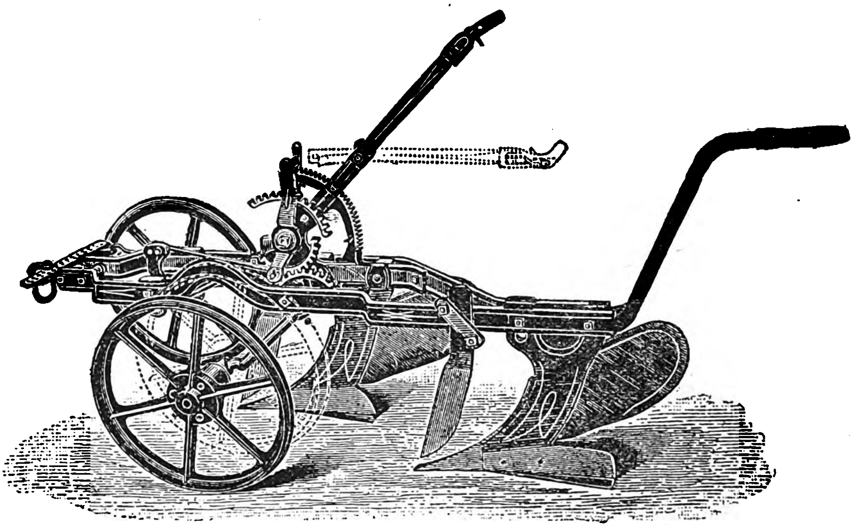

FIG. 14.—Two-furrow orchard plow, made in Canada.

The requirements in plows of this character are that they must be able to turn on short headlands, must have adjustments so that they can be set to plow close when throwing toward trees or vines, and that all levers must remain low while the plow is at work to prevent their striking the branches or vines. One of the manufacturers gives the following description of the construction of a plow of this character:

> The land wheel can be set either at an ordinary distance from the frame or inside the line of the rear bottom. Provision is made to facilitate the plowing of the ground under low branches by throwing down the lever without altering the position of the plunger rod. The handle is designed to leave the landside clear of all obstructions. Instead of projecting in the usual manner it is set in line with the inner side of the rear beam. The construction of the plow enables the fruit grower to insure getting the best possible results by plowing close up to his trees and vines. The frame is made of high carbon steel and the moldboards

of soft center steel. Its capacity is 8 inches wide per bottom and 3 to 7 inches deep. It is equipped with chilled shares and two extra chilled shares or, if customer prefers, with two steel shares in all. Its weight is 260 pounds.

The demand for plows of this kind is so varied that it would be difficult to indicate the type of construction most in favor. It is felt, moreover, that the plow bottoms and other equipment are generally so different from what American manufacturers ordinarily turn out that, in view of the conditions existing in the marketing of such goods in Australia, it would be inadvisable to undertake their manufacture. The demand for any particular type is hardly large enough to justify such a project, and local manufacturers, with the advantage of a high tariff, are rapidly supplying most of the requirements.

There is a demand in Australia for small, wheeled, two-furrow plows for orchard, vineyard, and similar work, and so long as American manufacturers can have their standard lines introduced in that country they will do well to assist their agents in developing the market.

OTHER WALKING PLOWS.

Both chilled and steel vineyard plows are sold in some sections of Australia, as also some single-furrow reversible plows, walking plows with potato-digger attachment, and heavy contractors' plows. The same types used in the United States have proved satisfactory for Australia. The demand for these is rather small and confined to the more settled districts of the country.

HARROWS.

Owing to the rather small rainfall in the principal wheat-growing sections of Australia, the question of preserving all possible moisture in the soil and of reducing the loss by evaporation is all-important. Australian farmers realize that thorough and frequent cultivation of the soil is necessary, with the result that there is a very large demand for machines to do this work.

SPRING-TOOTH RIDING HARROWS.

Taking Australia as a whole, there is no doubt that the spring-tooth harrow is the machine most widely used to keep the land in good tilth. The preference shown by farmers for this machine, as against other implements built for similar work, is said to be largely due to the fact that the vibration of the spring tooth, for one thing, tends to pulverize the soil more thoroughly, while it also leaves the ground in a rougher condition, which is an advantage when the soil is liable to be blown away by the wind. Farmers are very discriminating in the selection of machines of this type, and the manufacturer who offers anything showing an advantage is certain to be rewarded with a large demand for his product. It can not be said that American machines enjoy any great degree of favor at the present time. It is not unlikely that a certain Canadian manufacturer alone ships twice as many spring-tooth harrows to Australia as all the manufacturers in the United States combined. On the other hand, nearly all the important local manufacturers have in recent years undertaken the construction of these machines. While a duty of 25 per cent has to be paid on spring-tooth harrows made in the United States, there is much reason to believe that under present conditions American manufacturers would be justified in making efforts to obtain a greater share of this business. While the rough lands and the conditions under which this machine is to work in Australia necessitate a strong construction, this is rather on the lines of the machines made by several American manufacturers.

The features that should receive greatest consideration are strength and effective work. It is important that the frames be very strong and thoroughly braced at all points. The most popular harrow of this type on the market has a steel axle extending through the entire width of the machine, which serves materially to strengthen the frame. Machines with stub axles are liable to wabble very soon in the severe work they have to do. The wheels should also be very strong and made of steel, about 40 inches in diameter and 4 inches wide. Pressure springs should be provided to hold the teeth at work on very hard ground, while it is necessary that they be adjustable so as to reduce their pressure when working lighter soils. The pressure should be so arranged that the teeth will be forced into the ground when passing over holes, shallow furrows, and other land depressions. The teeth themselves should be made of resistant materials and reinforced to prevent breakages in striking obstructions and to give them greater flexibility. Adjustability, so that their slant or pitch may be easily and quickly changed, is also a necessary requirement. The cultivators most in favor are built in sections, with three or four teeth in each, each section being entirely independent of the others, so that good work will be done in uneven lands.

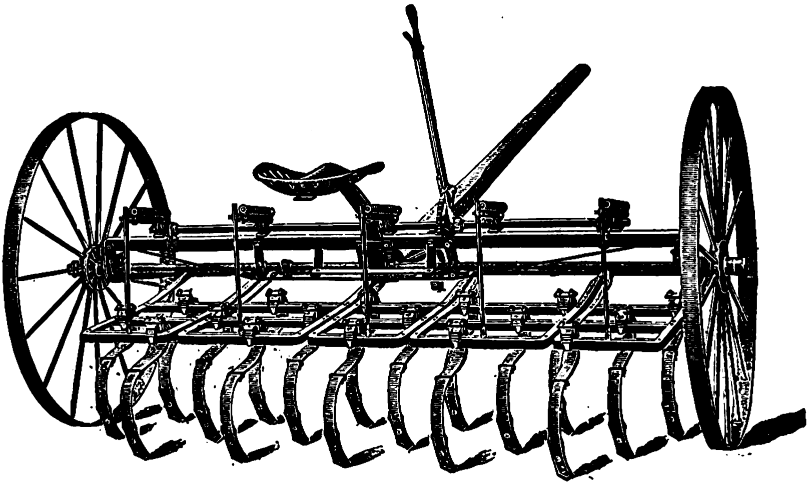

FIG. 15.—Seventeen-tooth five-section spring-tooth harrow, made in Canada.

The most popular sizes are 6 and 8 feet. The former has from 13 to 16 teeth, and the latter from 17 to 22 teeth; 1¾ or 3 inch points are furnished. Fore carriages are sold as extras and are quite frequently purchased. The small machine is supplied with pole and three-horse evener and the larger one with two poles and four-horse evener. A number of these harrows are sold with broadcast grain and with grass seeders. There is some demand also for 7½ and 9 foot harrows of this type.

There is some demand for stiff-tooth harrows built along the lines of the spring-tooth harrow described. Some of these machines on the market have spring-pressure arrangements, while others do not have this feature. These machines are largely used as weeders and are often equipped with broad points. Machines that can be changed into spring tooth from stiff tooth and vice versa seem to be preferred. These implements are very popular in the alfalfa-growing districts, and manufacturers should be prepared to supply alfalfa points for them.

WALKING SPRING-TOOTH HARROWS.

Walking spring-tooth harrows are widely used throughout Australia, especially by farmers beginning operations. Angle steel frames, steel pipe-tooth beams, teeth with reversible points, steel runners to prevent wear on the frames, and draft hook with holes for different draft adjustments are among the features that Australian farmers have in mind when purchasing walking spring-tooth harrows. One and three-fourths inch points are regularly furnished, but wider points are often sold at an additional cost. These harrows are made in various sizes, but the most widely used seem to be 5 and 7½ feet, with 15 and 23 teeth, respectively. Many of them are furnished with a riding attachment, and in some cases they are also equipped with special alfalfa points. For vineyard work a 9-tooth spring-tooth harrow, to cut 2½ feet and equipped with a substantial double steel handle, is largely sold, and this is used also by a large number of orchardists.

DISK HARROWS.

While the spring-tooth harrow is doubtless the most widely used tillage implement wherever wheat is grown, the disk harrow is much preferred by Australian farmers in connection with the cultivation and pulverization of the soil for other crops, and even in connection with the growing of wheat (where the land is reasonably free of stumps) a good number of them are to be seen, although in that case the construction varies considerably from that of American disk harrows.

There are few local manufacturers turning out the type of disk harrow that is typical of the factories in the United States. Where these harrows are used American manufacturers largely supply the demand, and owing to their reasonable cost, in comparison with what is produced locally, there is undoubtedly an increasing call for them. The only disagreeable feature in this, so far as American trade is concerned, is that, as they become more popular, the local manufacturers will more extensively take up their construction. At the present time, at any rate, a relatively fair demand exists for disk harrows of American manufacture. The features making the greatest appeal to Australian buyers are flexibility and strength. The two gangs must work independently of each other, and they should be so set that the inner ends will take the ground and remain there in hard soils. Six and eight foot disk harrows with plain 16 and 20 inch disks are those most largely sold. The demand for wider harrows is almost nil, whereas a good many 4 and 5 foot machines are sold. When these machines are intended for the cultivation of wheat lands it is important that the frames be as high as possible, so that if used soon after the harvest, when the stubbles left by the stripper remain in the ground, the machine will not clog. Some broadcast grain seeders are sold with these harrows.

The demand for reversible disk harrows nearly approaches that for plain machines. The continuous working of these machines involved in fallowing has induced the Australian farmers to prefer disk harrows that can be set for inthrow and outthrow cultivation. To prevent leaving any uncultivated ground between the gangs, some manufacturers build them so that these can be worked one somewhat ahead of the other. Reversible disk harrows are sold in the same sizes, as regards width and diameter of disks, as the plain machines. They are equipped with fore-carriage but without pole and evener.

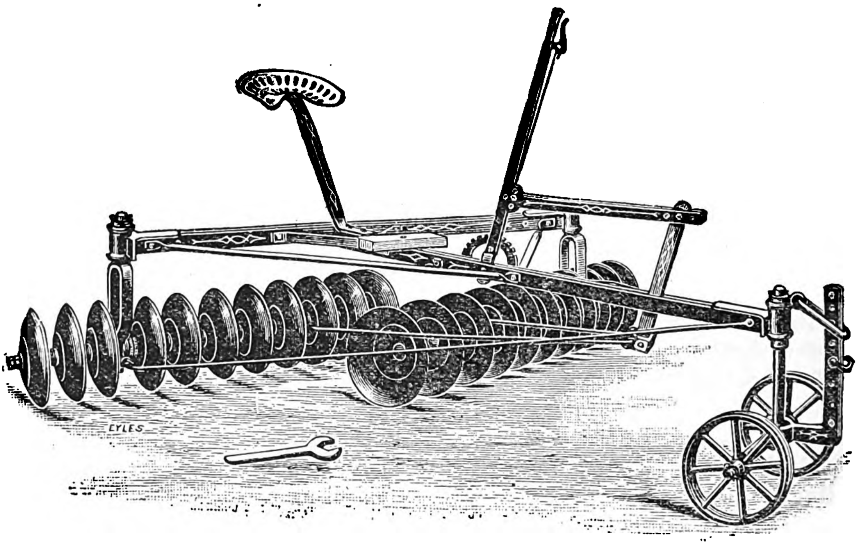

FIG. 16.—Overlap disk harrow, made in Australia.

Tandem disk harrows are sold in fair quantities, and there seems to be a tendency to use them increasingly. When soil conditions are favorable the soil is sometimes given a sort of hasty and rough cultivation preliminary to seeding, especially for catch crops. For this work tandem disk harrows are extensively in demand. They are sold in 6, 7, and 8 foot sizes and with 16 or 20 inch disks.

Orchard reversible disk harrows with extension heads, and disk harrows with two gangs of four or five disks each, which can be set together for regular disking work or wide apart for corn and sugar-cane cultivation, are sold in small numbers. The frame of these harrows must, of course, be high enough to permit their use as cultivators of growing crops.

Stump-jump disk harrows are also used to some extent. The disks are kept down by means of springs, which allow them to roll over when meeting stumps. Six and 8 foot harrows of this type are the most popular, but they are also made in 7 and 9 foot sizes. The demand is supplied entirely by local manufacturers.

English manufacturers sell a number of disk harrows of the heavy type turned out by them (described on page 137 of the writer's report on South Africa, Special Agents Series No. 146). The demand for them in Australia is not large enough to justify American manufacturers in taking up their construction for that country, but those who build them for the South African trade will undoubtedly find a ready market for a number of them in the Commonwealth.

Several dozen alfalfa harrows—the construction of which in all respects resembles that of the American-made disk harrows, with the exception that they have a star-like set of spikes instead of disks—are sold in Australia every year. The implement most widely used to cultivate alfalfa fields, however, is the walking lever spring-tooth harrow equipped with alfalfa points.

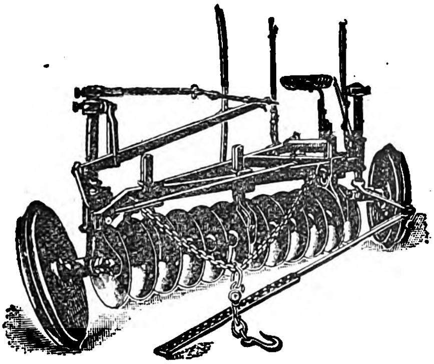

FIG. 17.—One-way disk cultivator, made in Australia.

ONE-WAY DISK CULTIVATORS.

In construction this implement is half way between a disk plow and a disk harrow. It is distinctly an Australian machine, invented in the Commonwealth and manufactured exclusively in that country. Nearly every large implement maker builds it, the demand being very large. It is chiefly used for cheap, quick, and efficient cultivation or preparation of the seed bed and the working of fallow, and even stubble land, without previous plowing. It is built in so many different styles that it is not likely that any American manufacturer will attempt its construction.

These cultivators are built in both stump-jump and rigid styles and in sizes ranging from 7 to 14 disks, of 18 or 20 inches in diameter. They are generally designed to plow the land 4 or 5 inches deep and also to enable the farmer to take the disks off and put small mold-board bodies in their place. They are rather heavy implements, the weight ranging from 1,500 pounds in the case of an 8-disk machine to 2,000 pounds for a 14-disk machine.

SPIKE-TOOTH HARROWS.

There are innumerable varieties of spike-tooth harrows sold in Australia. A great many of the machines used are of local manufacture, but there is also a very strong competition in imported harrows. The United States, England, and Canada (and Germany before the war) have shipped these machines to Australia.

The types most in demand have the stump-jump feature—that is, the spikes jump to clear obstructions when coming in contact with stumps and stones, and reenter the ground automatically after these have been passed. U-bar harrows are also in great demand, and zigzag, diamond, screwed-teeth, driven-teeth, I-bar, channel-teeth, and several other types are also sold.

Spike-tooth harrows are furnished in sizes ranging from one to six sections, and always with suitable eveners. Local manufacturers equip them with one small wheel at each end of the evener bars and an extra wheel in the center when a very wide harrow is used.

The competition in these harrows is very keen, and the question of prices is therefore of great importance.

Spike-tooth harrows are frequently used behind grain drills to cover the seed. Harrow carts for them are very often supplied.

ROLLERS AND PULVERIZERS.

One of the principal uses of rollers and pulverizers in Australia is to make an even surface in land sown with wheat and intended to be cut for hay. This evening up of the land enables the binder to get closer to the ground, with the result that a greater tonnage of hay is harvested. The great majority of Australian farmers make their own rollers, consisting of a carefully selected tree trunk properly rounded.

Some solid face-steel cylinder rollers are also sold. The trade is supplied with locally made and imported machines. The sizes of these range from 5 to 10 feet in width and from 27 to 31 inches in diameter. The frame is so constructed that the machine can be weighted down.

Combined pulverizers and packers with open wheels to break down soil clods are also sold to some extent in sizes from 8 to 15 feet wide. Some manufacturers make these rollers in the 6½-foot size and so constructed that, for packing the land between growing rows of corn, enough spacing can be put in the center. The larger sizes are generally built with jointed frames to adapt the machines to uneven ground.

In some localities a few T-bar rollers 18 inches in diameter and 8 feet wide are sold.

GRAIN DRILLS.

The sale of grain drills constitutes one of the branches of the agricultural machinery business of Australia in which the keenest competition exists. The demand is large enough to be worth fighting for, and during the past few years local and foreign manufacturers have tried to excel each other in satisfying the Australian farmers by paying the closest attention to the building of machines with im-

proved features. The existence of a duty of 30 per cent on imported drills has, of course, been a most decided disadvantage for the foreign manufacturers, and they have been unable to retain the hold they once had in that trade. Only gradually and most reluctantly, however, have they given way to the local manufacturers. The extent of the decreased importation of grain drills can be summarized with the statement that in 1912 Australia imported about 6,000 drills, whereas this number became reduced to about 3,000 in 1914–15. It is but fair to admit that, while local manufacturers have been most substantially aided by the tariff, they have proved fully competent to supply the trade so far as the quality of the machines is concerned. It is true that when they first began manufacturing these machines they copied freely the best foreign machines in the market, but in recent years they have shown a great deal of inventive genius in evolving features meeting the peculiar requirements of Australia.

It is a remarkable fact that a single Canadian manufacturer supplies about twice as many drills to Australia as all the American manufacturers combined. The excellent sales organization that the Canadian firm maintains in Australia is unquestionably largely accountable for this, but one must give it credit also for a greater determination to hold its drill trade in Australia than has been evidenced by American manufacturers.

All the grain drills sold in Australia are of the combined fertilizer type. There is probably no other implement that the farmers of that country buy so carefully—which is only natural when one considers how much depends on the effective work of every part of the drill to insure a proper harvest. Strength to withstand the rough work these machines are obliged to do when seeding fields covered with innumerable stumps projecting several inches above the surface of the land, and the most careful, positive, and substantial construction to avoid the shocks and jars that may interfere with the proper working of the delicate mechanisms governing the uniform and continuous distribution of seed and fertilizer—these are the features that manufacturers should chiefly bear in mind in building drills for the Australian trade.

While it is difficult to indicate what future opportunities the drill trade of Australia holds for American manufacturers, it is felt that there is a great deal of interest in knowing the salient features of the drills considered most popular in that country. The construction of these, therefore, will be considered in some detail.

The main frame is made of heavy angle steel 2½ inches deep and ¼-inch thick, with corners reinforced with ¼-inch steel plate. The center bar is made of I-beam 3 inches deep and strongly bolted and riveted to the sides. The frame is trussed together with steel bars, and the axle is hung to it in such a way that sagging is rendered impossible. The main axle is of cold-rolled steel 1½ inches in diameter, running in self-aligning bearings 11 or 12 inches long, which hang in unbreakable steel brackets bolted to the sides. On the largest drills two ½-inch rods are put under the center bar, which can be tightened by nuts at both ends to prevent sagging.

Both drill wheels are driving wheels and are usually made of steel, although wheels with wooden felloes are sometimes supplied. They have 4-inch tires and about 14 staggered and removable spokes. The wheels wear on self-aligning bushes of liberal dimensions and not on the main axle. These bushes are so made that they set the wheels out on top and in at the bottom and front, giving them a pitch and gather similar to wagon wheels. The important thing is to prevent the wheels from spreading at the bottom and rubbing the hopper at the top, and also to lighten the draft on the horses. Wheel scrapers are supplied when drills are used on muddy soils.

Quantities of sowing are altered by changing the speed of the grain feeders. This device must be absolutely positive to prevent the drive from slipping and consequently missing sowing. Spur pinions, having four speeds each, give 12 different quantities of sowing, since three pinions are used as a rule. The quantities that can be sown vary from about 20 to 125 pounds of wheat and from 30 to 150 pounds of oats per acre. Barley can be sown in quantities of from 40 to 200 pounds, and other grains in proportion. To change the speed, the lever holding the double pinion is dropped, the required change pinion is placed in position, and the lever is raised again. A printed table shows what each pinion sows. The gearing is placed at the back of the drill, near the center, so that it will be easy to get at. It is thrown out of gear automatically when the disks or hoes are lifted out of the ground.

The grain distributor or cup is of the well-known double-run force-feed type, with an elevated feed wheel raised above the top of the cup to keep the grain continually agitated, preventing it from bridging and insuring a continuous and even flow. One side of the cup sows wheat and small grains and the other side oats, barley, corn, and other large grains. A hinged plate, at the center, covers whichever side is not used. Special feeders for peas are supplied when ordered. All feed wheels are driven by a single square steel shaft that passes through each one, so that every revolution of the wheel delivers the same amount of grain from each cup.

The fertilizer speed gear must work well under all conditions. Change of quantity sown is effected as with the grain gear, and while the machine is in motion. Two sets of fertilizer feeders are supplied with each machine, as also a shaft with six pinions. When disks or hoes are raised the fertilizer gear is automatically thrown out of gear, and the manure can be cut off entirely and only grain sown.

Uniform flow of fertilizer is essential, as also the ability of the machine to sow all kinds of fertilizer, such as chemical, farmyard, wet, dry, sticky, or lumpy. The fertilizer distributor or cup has star force-feed plates with long prongs or fingers. A distributing range of from 30 to 600 pounds per acre is required, while at times special feed stars are supplied to sow as little as 10 pounds per acre. All feeders are driven by one shaft. The construction should be such that the delivery openings will not get blocked and will be easy to clean.

Both disk and hoe drills are largely used. The most popular drills on the Australian market are so constructed that hoes or disks will interchange on the frames. Disks must be kept rigid, and the drag bars should be of liberal dimensions, well braced, impossible to bend or get out of shape and should also have plenty of clearance. To prevent disks from gathering trash or clogging in sticky or dirty land is important. Seeding sometimes must be done in such lands or in loose sandy soils with wet straw. The delivery opening at the bottom must be so shaped that no trash or dirt will stick to it. Closed shields must protect the seed until it enters the ground, and the angle of cut should be such that the seed will be properly covered to prevent birds from getting it. Lubrication is a feature carefully looked into by Australian farmers. Every disk should have a positive oiler. Scrapers and shields should be separate parts, not cast to either boot or disk, so that when worn they can be replaced at a small cost. The farmers prefer scrapers that can be entirely thrown off the disks when not needed.

Hoes are also equipped with spring pressure and with stump-jump springs of such a range that the hoe points are raised 16 inches from the ground when striking an obstruction, immediately coming back to normal working position. All parts connected with the stump jump should be extra strong. A lever is provided so that the drill can be set in a zigzag position to prevent clogging in trashy lands. The hoes alternately move 4½ or 5 inches rearward or forward, giving a clearance of about 10 inches between hoes. Hoe points are of hard steel and reversible, and should be adjustable to handle properly different classes of soil.

The hoppers should be of good material, roomy, and easy to fill. The inside should be so constructed that no seed will lodge anywhere and will easily find its way to the feeds. The lid when open should be tight against the back of the box so that no grain will be wasted while the hopper is being filled.

Steel ribbon conducting tubes should be supplied. The vibration makes them force-feed tubes so that the seed and fertilizer can not hang in them. Any possibility of their buckling or of a stoppage of flow must be carefully avoided.

Two side bridles instead of a center one are preferred. Drills should also be equipped with an effective land measure, strong footboard extending the whole length of the machine, pole, and neck yoke. Nine-furrow drills are generally supplied with a two-horse evener, 11-furrow drills with a three-horse evener, and the larger drills with a four-horse evener and two poles. Ordinarily no drag chains are supplied.

The sizes with which the trade is generally supplied are 9 ,11, 13, 15, and 17 furrows with either disk or hoe drills, and the spacing between furrows is almost invariably 7 inches. The demand is rather for the large sizes. While disk drills seem to have a larger sale than hoe drills, both types are sold in great numbers. Some manufacturers supply drills larger than the 17-furrow, but the demand for these is rather unimportant.

A number of grass seeders are sold in Australia, as also a few plain grain drills without fertilizer attachment.

BROADCAST FERTILIZER AND LIME SOWERS.

A good many broadcast fertilizer and lime sowers are sold in Australia, although it should be understood that the fertilizer grain drill is the machine most extensively used in fertilizing the soil for the crops most widely grown in Australia. Broadcast sowers, however, are used in some of the wheat-growing districts, as well as by orchardists and farmers in general.

The quality of the machines most in demand corresponds in every respect to the high type of farm machinery ordinarily seen in Australia. Strong staggered-spoke steel wheels, star plate force feed, revolving cylinder agitator, exclusive steel and wood construction, instantaneous changing of quantity sown while machine is in operation, steel plate bottoms, wind boards, and large and well-constructed hoppers are the necessary features in a machine designed to appeal to the Australian farmers.

The most popular size sold is the 8-foot, but some merchants carry in stock machines ranging from 6½ to 9 feet, with hoppers having a capacity of 10 to 12 bushels. Machines must sow from 50 to 2,000 pounds of material per acre. They are ordinarily supplied with poles, neck yokes, and eveners.

Manure spreaders are not sold in great numbers as yet, but there is every indication that they will become more and more popular. The present demand is supplied by American and Canadian manufacturers.

CORN PLANTERS.

In view of the relative unimportance of corn growing, it is only natural that the number of corn planters sold in Australia is rather small. These machines are sold chiefly in Queensland and New South Wales, the only two States of the Commonwealth in which corn is grown to any really significant extent. A number of single-row machines are sold in other parts of Australia, but these are used for the planting of peas, beans, and other such crops, rather than for corn planting.

American single-row and double-row corn planters supply most of the Australian demand for such machines. The number of single-row machines is much larger than that of double-row. The most widely sold single-row planter has split tire covering wheels, is chain driven, has large hoppers, and as a rule is wanted with fertilizer attachment. A few machines are sold equipped with markers. Gauge wheels are provided in most of these planters.

The demand for two-row corn planters is increasing. These are supplied with shoe runners, single-disk or double-disk openers, and are designed to plant corn, ordinarily, from 40 to 48 inches apart. Check-row planters are increasingly sold, to drop two, three, or four kernels in hills either 28, 41, or 50 inches apart. Fertilizer attachments are sold with the majority of planters.

The question of plate equipment should be properly understood between manufacturers and importers, but in all cases at least one blank plate should be furnished.

CORN CULTIVATORS.

American types of corn cultivators are sold, almost exclusively, in Australia. One-horse machines, made of steel, combining the features of corn cultivator, horse hoe, scarifier, potato hiller, and furrower, with plow attachment, and equipped with two levers to regulate both the depth and width of cultivation, with open or pressed steel wheels, and with five or nine teeth or shovels, are those most extensively sold in Australia. The demand for these is rather important, for, in addition to corn cultivation, they are also used for the cultivation of other drill-sown crops. One-horse 14-tooth cultivators with reversible chisel or diamond-shaped teeth are also sold to some extent.

Single-arch pivot-wheel two-row cultivators with riding attachment are increasingly sold for the cultivation of corn and other drilled crops.

CORN BINDERS—CORN PICKERS.

Corn binders and pickers are almost unknown in Australia. Corn is not grown with anything like the system observable in connection with the wheat crop, nor is it an important crop in the Commonwealth. The outlook for the sale of these machines is entirely dependent upon whether the Australian farmers will give the corn crop greater attention in the future than hitherto. At the present time there are no indications that such will be the case for some time to come, although an American familiar with the importance of the crop in the United States and its value in connection with the raising of stock for both beef and dairying purposes is at a loss to understand why it should not become a more widely cultivated crop in Australia. It is not improbable that if an aggressive educational campaign were undertaken, the use of American machinery demonstrated, and the great utility of the crop proven, the farmers of Australia would gradually take up the growing of corn on a large scale until it would become an industry of considerable magnitude. Owing to the labor situation, these machines should become widely used whenever the cultivation of corn is seriously undertaken in Australia.

CORN SHELLERS.

While the demand for corn shellers in Australia is not in the least important, except in Queensland and New South Wales, the Commonwealth has heavily penalized the importation of corn shellers by imposing a duty of 25 per cent in order to protect a manufacturer in Queensland with an approximate output of 250 large corn huskers and shellers operated by gas engines of from 15 to 20 horsepower. This has had the effect of keeping foreign shellers of that capacity out of Australia, and the market that American manufacturers are able to supply is confined to machines of the small stationary type, in one and two hole sizes and generally operated by hand power, in the sale of which they do not have to face the competition of local manufacturers because the latter do not make machines of that type.

POTATO MACHINERY.

Considering that about 150,000 acres of land are devoted to potato growing, the number of modern machines in Australia for the raising of that crop is rather small. It is felt that this is at least partly due to the meager efforts so far made by importers to acquaint the growers with the labor-saving and other excellent features of this type of machinery. A growing interest has been discernible in the past few years, and manufacturers would appear to be justified in making some efforts to induce the importers of farm machinery to popularize such implements. In the absence of manufacturers' representatives to assist in this object, the makers would doubtless find it advantageous to send their catalogues to the Australian merchants, accompanied by such special data as may lead them to undertake an educational campaign among potato growers. Every condition seems to be present for the creation of a good demand if the proper efforts are made.

The States of Victoria, New South Wales, and Tasmania offer the greatest possibilities in this connection, although Queensland and South Australia should not be ignored. Tasmanian soils are rather sticky, as a rule, and machines that will work satisfactorily under such conditions are likely to be in great demand there. Ordinarily potatoes are not grown upon an extensive scale, but with the increased use of machinery for the crop it is reasonable to expect that a good many farmers may take up their cultivation along extensive commercial lines.

A certain number of potato planters and diggers are already sold, the former often equipped with fertilizer attachment. The demand is so small at the present time that Australia may be considered a virgin field, which can be made rather attractive if manufacturers and importers will get together to acquaint farmers with the advantages of the machines. American and English machines are sold, but as yet it can not be said that the trade has shown a preference for any particular type.

BINDERS.

In most countries the hay crop consists almost entirely of meadow and other grasses, while in Australia a very large proportion of the hay is made of cereal crops, mainly wheat and oats. It is almost the universal rule in Australia for a farmer to cut for hay about 25 per cent of his wheat-sown land, such hay being the staple food for his horses. Wheaten hay is cut before the heads begin to harden, when the nourishing elements are distributed throughout the stalk.

Normally about 5,000 binders are imported into Australia every year. While this is a rather large number, the fact that wheat growing is so important an agricultural pursuit in Australia may have led some to believe that the demand for binders was greater. As indicated elsewhere, however, wheat for grain is harvested almost entirely with machines of the stripper type. Six-foot-cut left-hand binders are chiefly used, although some 5-foot and a few larger binders are also sold. These machines are regularly equipped with sheaf carrier and transport trucks. It is an important requirement that the knives may be set for very close cutting, since this will enable the farmer to cut a greater tonnage of hay. There are no particular points of difference between the binders used in the United States and those used in Australia, although a preference is shown for strong and well-built machines.

The binder trade of Australia is almost wholly in the hands of American and Canadian manufacturers, the latter having much the largest share. English manufacturers formerly had a good binder business in the Commonwealth, but their trade has dwindled to a few dozen machines. No binders are manufactured in Australia, this being one of the few machines used in wheat growing that are not made in that country. While rumors have been heard from time to time to the effect that some Australian manufacturers had under consideration the manufacture of binders, it is felt that the present demand is not large enough to justify their doing so, particularly since they would have to compete with foreign manufacturers who are able to produce such machines in very large quantities and who are well established in the Australian trade.

The demand for reapers is practically nil. However, a few mowers with reaper attachments are sold.

Nearly every Australian farm is supplied with knife and tool grinders. American manufacturers have a large share of the trade.

STRIPPERS—STRIPPER HARVESTERS—REAPER THRASHERS.

These three machines, in the order given, indicate the evolution of wheat harvesting in Australia.

The plain stripper is essentially the machine of the pioneer wheat grower, which even to-day persistently accompanies him wherever he goes in quest of new lands. These machines, therefore, are largely used in those newly developed sections of Australia where the farmer must be sparing of expense and give much of his own labor to overcome obstacles. All the plain strippers used in Australia are made locally, and an evidence of the localized demand is afforded by the fact that nearly all the larger implement manufacturers of the country have gradually discontinued their manufacture. The plain stripper, as its name indicates, strips the wheat heads off the standing crop, and after they have been thrashed by the machine itself the unseparated wheat and chaff are thrown into a box until this is completely filled, when it is emptied and the machine resumes its work. The use of plain strippers makes necessary the use of a winnower

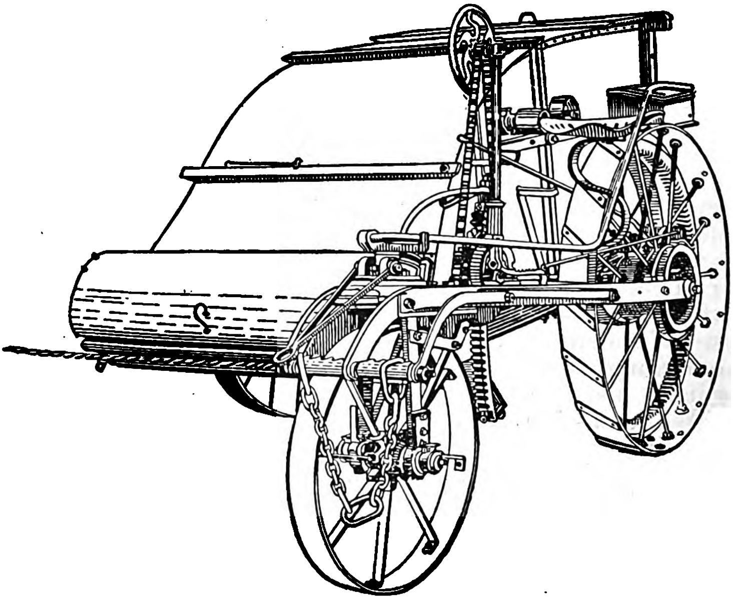

FIG. 19.—Stripper, made in Australia.

to separate the wheat from the chaff. There is not the slightest reason to believe that the construction of this machine would appeal to any American manufacturer.

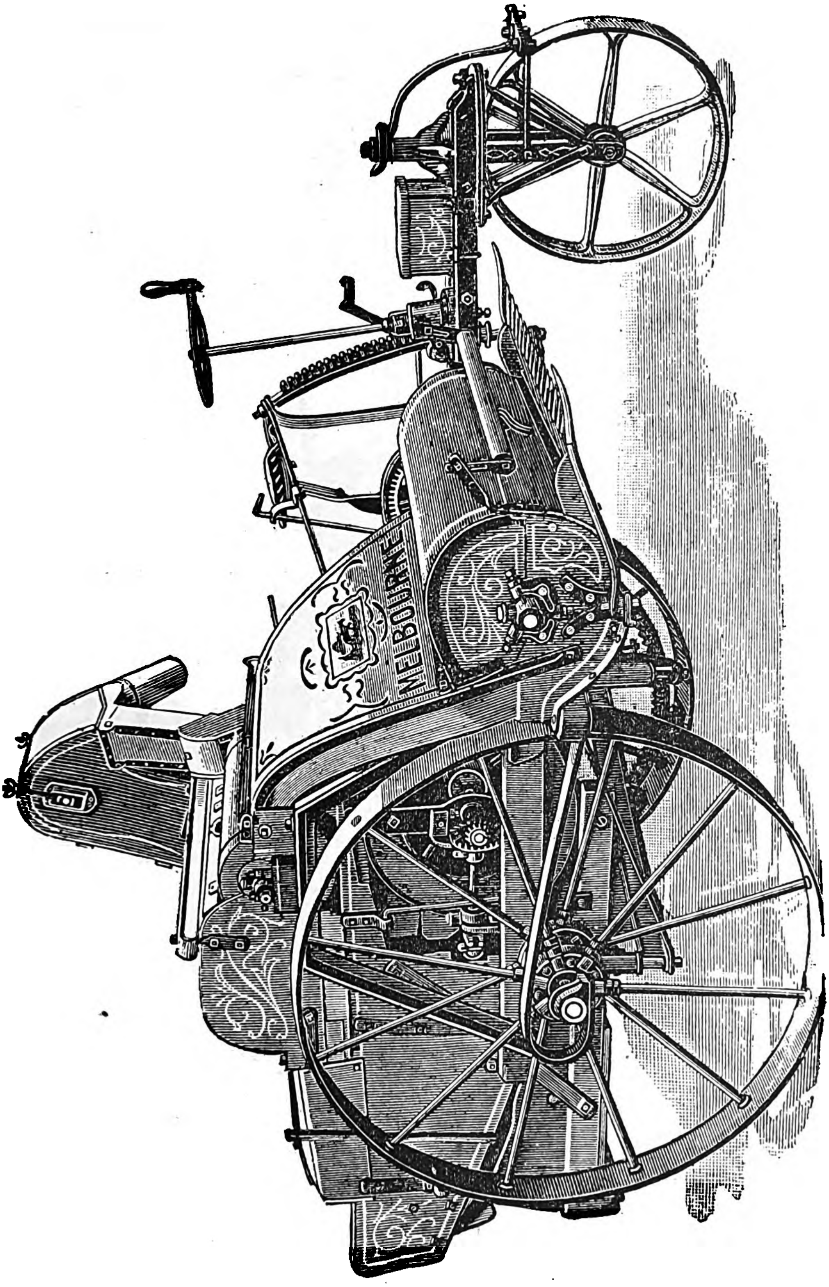

Fig. 20.—Stripper harvester, made in Australia.

The stripper harvester, until a few years ago, was the machine chiefly (in fact, almost solely) used in Australia for harvesting wheat—combining in one machine the ability to harvest the standing crop and at the same time to thrash and separate it, making a sample ready for marketing purposes in one operation. The machine originated in Australia, and for many years it was manufactured only in that country. Later, manufacturers in the United States and Canada took up the construction of stripper harvesters, and in spite of the high rate of duty they succeeded in building up a rather satisfactory trade for them. The method of getting the

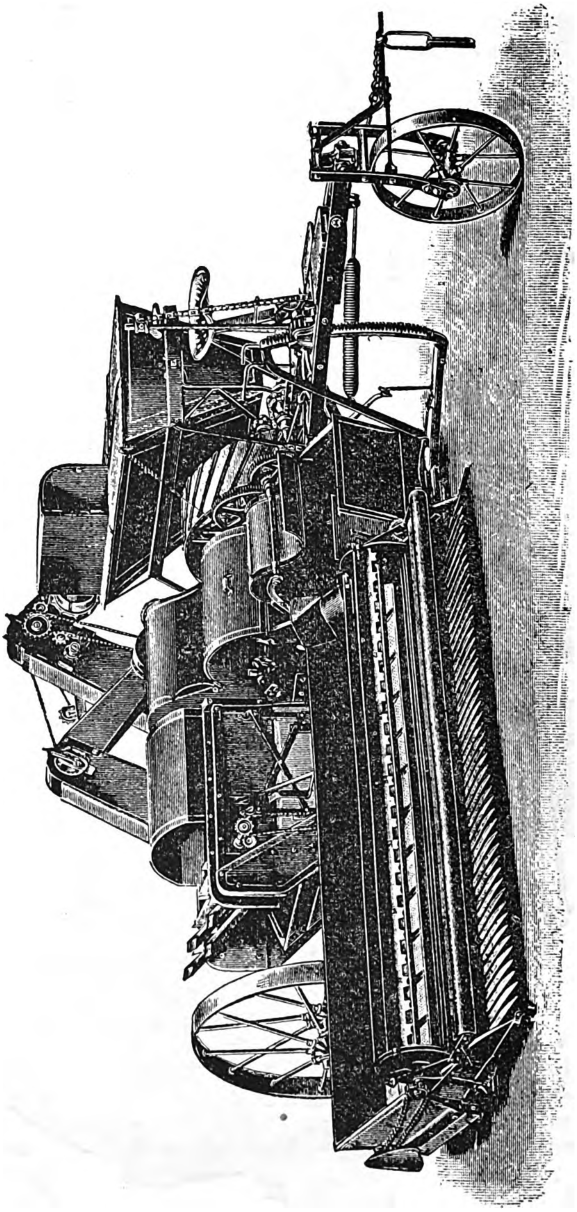

FIG. 21.—Reaper-thrasher, made in Canada.

wheat into the machine is almost identical with that in the plain stripper—that is, the crop is combed off until the ears alone project above it, when a high-speed beater drum beats or breaks them off and throws them into the machine where thrashing and separating devices put the grain in marketable condition. Stripper harvesters are made in sizes ranging from 5 to about 10 foot cut, the 6-foot size, however, being that most widely sold. Harvesters equipped with gas engines to run the internal mechanisms are already being sold in moderate numbers.

The reaper thrasher is the most modern device for harvesting wheat in Australia, and its increasing popularity among the farmers of that country would seem to prove that it is destined to supplant altogether the stripper harvester; for, in addition to possessing nearly all the advantages of the latter machine it has several improvements that save grain and give it a greater capacity for work with an equal number of horses. Waste of grain in harvesting with strippers has been a great source of loss. The high speed at which the stripper beater drum revolves causes the spitting of grain out over the comb. With the reaper thrasher the wheat stalks are drawn through the comb, or through guards or fingers like those of the binder in certain makes, and as the machine moves forward through the crop this comes in contact with the knife without any waste of grain whatever. This cutting off of the heads before the crop can pull heavily upon the comb or cutter bar greatly lessens the draft and also prevents rotten crop from being pulled down by the roots, as often happens with the stripper. The most important difference, as is readily seen, between the stripper and the reaper thrasher is that with the latter machine the crop is cut with a knife whereas the beater drum does this in the case of the stripper. The manufacturers of reaper thrashers have placed so much faith in the advantages of their machine that in some cases they have entirely discontinued the manufacture of stripper harvesters and are concentrating their entire efforts on the sale of the new machine.

For the first time in the history of Australian agriculture the advantage of making the most satisfactory machine to harvest the wheat crop of that country has passed from the local manufacturers to those of foreign countries—a fact that is well reflected in the increased value of the imports under the heading of stripper harvesters. It will be very difficult indeed for the Australian manufacturers to regain their former position, for the reaper thrasher embodies a number of features that will increase the cost of manufacture to the local firms and make it difficult for them to compete freely with the foreign makers in machines of that type, even with a duty of nearly $70 on foreign-built machines.

The advent of the reaper thrasher, the manufacture of which was started three or four years ago by a large American firm, will in all probability prove an important factor in improving the position of United States manufacturers in the implement import trade of Australia. Indirectly, it will benefit them further, as they will doubtless be able to offer that machine successfully in Argentina to replace the Australian stripper harvester, which that country had been importing upon a rather large scale during the past few years. The peculiarities of the Australian market are such that the manufacturers of harvesting machinery in the United States who are not at present substantially established in the Commonwealth are not advised to take up the manufacture of reaper thrashers without first being certain that they can make satisfactory arrangements for the sale of the machine in that country.

MOWERS.

A large number of mowers are sold in all the agricultural districts of Australia, the demand being greater in the eastern States. While they are generally intended for the same work for which mowers are used in the United States, they are in some cases employed in the far-outlying wheat-growing sections of the Commonwealth to cut wheat and oats for chaff-making purposes, in which event machines cutting close to the land are preferred. On the other hand, alfalfa is sometimes cut with binders.

American mowers are very popular in Australia, although Canadian manufacturers have also a very good share of the trade. English mowers are still imported in small quantities. The manufacture of these machines has not so far been undertaken in Australia.

The sizes sold range from 3½-foot-cut one-horse mowers to 7 and 8-foot-cut machines, the 4½ and 5 foot sizes being those in greatest demand. In Tasmania nearly all the mowers sold are of the 3½-foot size. Importers have often found it necessary to supply light and heavy machines, the latter generally having stronger frames and broad-faced wheels. Pea-harvester attachments are frequently sold, and reaper attachments are also in demand in certain districts. Special heavy knives to cut weeds and small brush are occasionally required.

RAKES.

All-steel self-dump sulky rakes are handled by nearly every importer of agricultural machinery in Australia, the total demand reaching fairly important proportions. They are used chiefly in connection with the alfalfa and other grass crops, although in some sections the farmers utilize them to rake small scrub, roots, and other rubbish off the land, which is necessary for several years after the timber growth of the land has been burned off in clearing it for cultivation.

As a rule, a rather heavy type of rake is in demand, although the heavier machines as manufactured in the United States have proved satisfactory for Australian requirements. Eight and 10 foot machines equipped with 25 and 30⅝ inch teeth, respectively, in the case of light rakes, and with 30 and 38½ inch teeth in the case of heavy rakes, are those most largely sold. All rakes sold have steel wheels.

Many American rakes are sold in Australia, Canadian and English manufacturers participating also in that trade. Rakes are not extensively manufactured in Australia.

Side-delivery rakes are increasingly in demand, and the best machines of this type made in the United States and Canada will probably become extensively used in Australia as time goes on.

In New South Wales and Queensland small numbers of wooden sweep rakes have been sold, mostly of American manufacture.

HAY STACKERS—HAY LOADERS.

American hay stackers for use in connection with sweep rakes are sold in small numbers in Australia. The country offers very great possibilities in connection with any novel appliance to assist in stacking hay, as haystacks are to be seen on almost every farm.

Hay loaders of the American type are beginning to be in demand in connection with the growing of alfalfa and similar crops. Their popularity in Australia is growing, and eventually the demand should be of some importance.

HAY-BALING PRESSES—WOOL PRESSES.

While there is a small demand for hay presses in New South Wales and Queensland, the aggregate number of these machines sold in Australia is rather unimportant. This is largely due to the custom of cutting the hay into chaff and selling this in bags. One and two horsepower hand-feed, small belt-power self-feed, and motor self-feed presses, however, are occasionally sold in the 14 by 18, 16 by 18, and 17 by 22 sizes of chambers.

A good many wool presses are sold in Australia, but these are almost invariably supplied by the local factories.

THRASHERS.

A great deal of interest has been taken during the past few years in thrashers, and it is likely not only that this will be sustained but also that a large demand for these machines may eventually develop in Australia. The question of changing the harvesting methods, at least in some of the wheat-growing States, is being much discussed by prominent farmers and those connected with the agricultural educational institutions of the country. If it should be conclusively proved that the separate thrashing process is more advantageous than that of harvesting wheat and similar grains with machines of the stripper type, a very attractive demand for thrashers would undoubtedly develop at once. A disagreeable feature in this connection, from the American manufacturer's point of view, is that in all probability the local factories would find themselves well equipped to supply the demand, especially those factories in which strippers, winnowers, and chaff cutters are built.

American peg-drum thrashers with a capacity of from 150 to 500 bushels of wheat per day, mounted on steel trucks and equipped with shakers and riddles of liberal dimensions and with straw carrier, bagger, and tailings elevator, to be run by small gas or steam engines, are being offered by an increasing number of merchants. A number of English outfits are also sold every year, but if a large demand ever develops it can be said with a reasonable degree of certainty that it will be largely for machines of the American type.

In Tasmania, owing to the moister climate, all the wheat is cut with binders and separately thrashed afterwards.

WINNOWERS.

Wherever plain strippers are used winnowers, necessarily, are in demand, and these are also required for cleaning grain for seed purposes. The demand is rather important, although it remains quite stationary because the extensive use of stripper harvesters and reaper-thrashers usually makes unnecessary the cleaning of grain to put it into marketable condition. As long as new areas of land are brought under the cultivation of wheat, however, there will be a demand for winnowers. As has been stated elsewhere, the farmers taking up operations in such new areas do not generally have the capital required to provide themselves with the more expensive machines.

Owing principally to a duty of 30 per cent on winnowers, and to the fact that these machines as used in Australia are rather more elaborate in construction than those used elsewhere, the demand is supplied almost entirely by local manufacturers, who produce a very creditable article. It is deemed quite improbable that the manufacturers of the United States could succeed in establishing a large demand for their winnowers in Australia.

Hand-power, horse-treader, engine, and motor winnowers are used in Australia. Hand-power machines are ordinarily sold to farmers, whereas the power machines are generally built for winnowing contractors who go from farm to farm to clean the wheat of farmers using plain strippers or of those who want their grain cleaned for seed purposes.

The most popular hand-power winnower is described by one of the leading manufacturers as follows: Hopper regulator board for regulation of feed on to sieves when cleaning for seed or any special purpose; feed regulators whereby the feed on to sieves can be regulated with but simple manipulation; wind regulator to regulate blast of wind on to sieves; spiked rollers for use in rough samples, to prevent sieves from being choked and to allow of quicker cleaning; chain drive throughout with tightening devices; hopper regulator by which angle of sieves can be altered without stopping machine; arch tailboard regulated from the side of the machine so that fine adjustments can be easily made; crank disk constructed to be adjustable to allow of a varied shake of hopper (it being desirable to lessen the shake of hopper in cleaning seed wheat or oats or in freeing wheat of oats); sieves of hand-woven wire supplied for wheat, oats, barley, as also a chafing sieve of hand-woven wire, a punched steel plate lip caver sieve, and an especially punched plate sieve for freeing wheat of oats; special sieves supplied for cleaning peas, etc.; machine equipped with transport wheels substantially constructed, having wrought-iron wheels with wide tires; extra wide tires supplied for sandy country; lever control for raising and lowering winnower on and off wheels. Two-wheel transport trucks are usually supplied, but four-wheel trucks are furnished at extra cost. In the two-wheel transports a pair of shafts are supplied for harnessing horses directly to the winnower. In four-wheel transports drag rods only are supplied for attaching behind wagon. The bagger is easily detachable from the winnower, has double delivery shoots and bag dumpers, and need not be taken off in transporting winnower.

The patent screen is constructed to allow of the opening between screen wires being adjusted by the operation of a lever so that the maximum or minimum quantity of screenings may be extracted from the wheat. It is possible to make a seed sample at one operation by using this type of screen. The screen is shaken with a compensating motion to increase screening capabilities, and a series of washers working between the wire openings keep them clean. The short screen is arranged so that half the screen shakes with the hopper, the bottom half being fixed. This is an advantage if the wheat contains drake, cracked grain, or small foreign seed, for when shaken a screen is more effective than when stationary. The portion of the screen shaken with the hopper may be changed for any variety of mesh. Some varieties of wheat require smaller meshes than others. The long screen is a plain hand-woven screen placed the length of the winnower. This screen does not permit of alteration unless especially ordered, but a long-screen winnower suits average requirements.

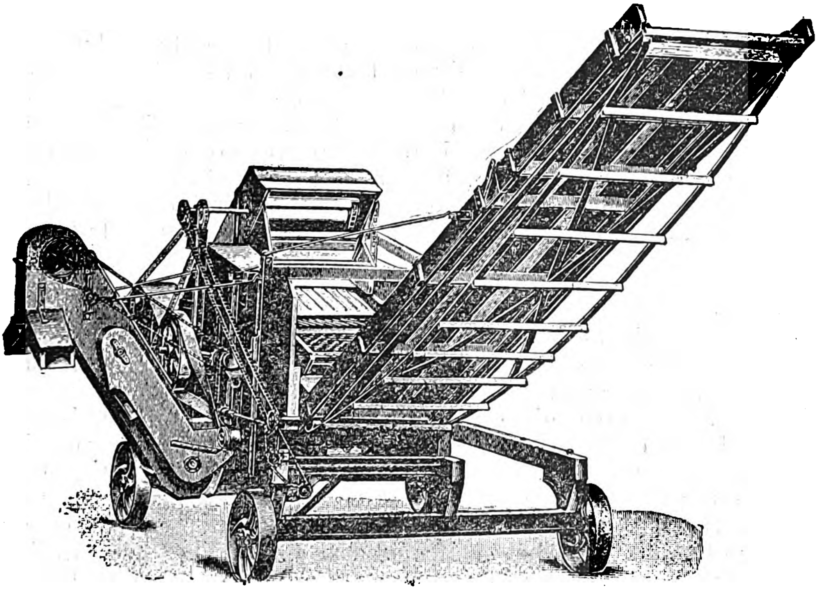

FIG. 22.—Power winnower, portable, made in Australia.

This type of winnower is furnished with either patent, short, or long screen. The patent-screen winnower has sieves either 26 by 22, 24 by 22, or 22 by 22 inches. The short and long screen winnowers are furnished with the same size of sieves as the patent-screen winnower, and with 20 by 18 inch sieves as well.

POWER WINNOWERS.

Power winnowers are made in three types, namely, horse-treader, engine, and motor-power. Their operation is described by a leading local manufacturer as follows: After the winnower has been drawn into the heap of wheat to be cleaned, the bottom portion of the feed elevator is lowered, and the stripped wheat is forked onto a conveying belt, which delivers it into a thrasher situated at the top of the winnower in engine and motor-power winnowers, and directly into the hopper of a horse-treader winnower.

The top thrasher is used for the purpose of thrashing heads and breaking up rough straw (that probably has resulted from stripping in damp weather or stripping in very tangled crops), before they go on to the sieves. This increases capacity and reduces repetition of operations.

After passing through the thrasher the stuff is delivered into a shaking hopper, where, through the use of certain sieves (under which is directed a strong breeze of wind from revolving fans), the chaff is blown out of the winnower, and the wheat passes through the sieves onto a screen, which frees it from small seeds and cracked grain. The wheat then flows into a trough, from which it runs into a wheat elevator, which, by means of revolving buckets, delivers it into bags held on bag trucks.

The screenings freed from the wheat are delivered by a chute into a small screenings elevator, built on the side of the wheat elevator, and are delivered into a bag. Any heads or particles of heads that escape being treated by the top thrasher flow over sieves into a trough at the back of the hopper; this is for the purpose of delivering them into a bottom thrasher, where they are again thrashed and delivered into an elevator to be conveyed back to the hopper for second cleaning. The lighter chaff and straw blown off the winnower falls on a long conveying elevator used for carrying it away from the winnower.

As regards the horse-treader winnower the following account is given: It takes the uncleaned wheat at one end, delivering the chaff at the other and the clean wheat and screenings into bags. A thrasher deals with the unthrashed heads, so that at the end of the day everything is cleaned up ready for another start. The winnower is self-contained and easily moved, and is operated by a horse tramping on a revolving inclined platform. No muscular effort of the horse is necessary; his weight does the work. Only bottom thrashers are fitted to the horse-treader winnowers, as the power employed will not permit of top thrashers being used as well. They are supplied complete with pole, or shafts if specially ordered, and two bag trucks. These winnowers are made in only one size, weighing about 4,000 pounds.

The engine-power is designed to be worked by an oil or other independent engine, and as the driving shaft is placed at right angles to the winnower the engine can be fixed clear of the wheat and chaff heaps. One pair of pulleys is at the back of the machine, but another pair can be fixed at the front so the winnower can be moved about 10 feet into the heap without moving the engine. Horizontal feeding elevators can also be supplied for use with large heaps, to do away with moving the engine. These winnowers are supplied with pole, or shaft if specially ordered, and two bag trucks. They are also furnished with bottom thrasher, or top and bottom thrashers. This type of winnower weighs 3,000 pounds.

The motor winnower is equipped with a 5-horsepower gas engine, which is set on the machine so that, when not used for winnowing, it will drive a chaff cutter, grinder, saw bench, pump, sheep shearer, or any other machine. The thrashers fitted to this winnower will deal with all samples. The engine is protected under a dust-and-rain-proof steel cover, and as the machine is self-contained it is moved as a whole. The pole, or shaft, and bag-truck equipment is like that on the other power winnowers. This winnower weighs 4,000 pounds.

GRAIN AND SEED CLEANERS AND GRADERS—SEED-PICKLING MACHINES.

Combined seed cleaners and graders for all kinds of seeds, capable of separating oats from wheat and other grains, are quite commonly used. Several local manufacturers build them, but one or two American makes have become quite popular in Australia.

Wheat and grain pickling machines are coming into extensive use in Australia to replace the old-fashioned methods of shoveling seed and solution over a cement floor. While some satisfactory machines are produced in Australia, the complaint has been made that these are rather high in price, and it was indicated to the writer that American manufacturers might be able to create a market in the Commonwealth for their machines. An important requirement is that they should be able to handle at least 3 bushels of seed, as all grain is put in bags weighing 180 pounds.

CHAFF CUTTERS.

Chaff cutters are very extensively used in Australia. As already indicated, about 25 per cent of the area sown with wheat and oats is cut for hay with binders and this is afterwards cut into chaff. In a large proportion of the wheat-growing areas of Australia the rainfall is so seasonable that wheat is practically the only crop that farmers can grow with any real assurance of success. The cultivation of that cereal, furthermore, is done on so large a scale that the farmer must keep a large number of horses, since, in addition to his land under

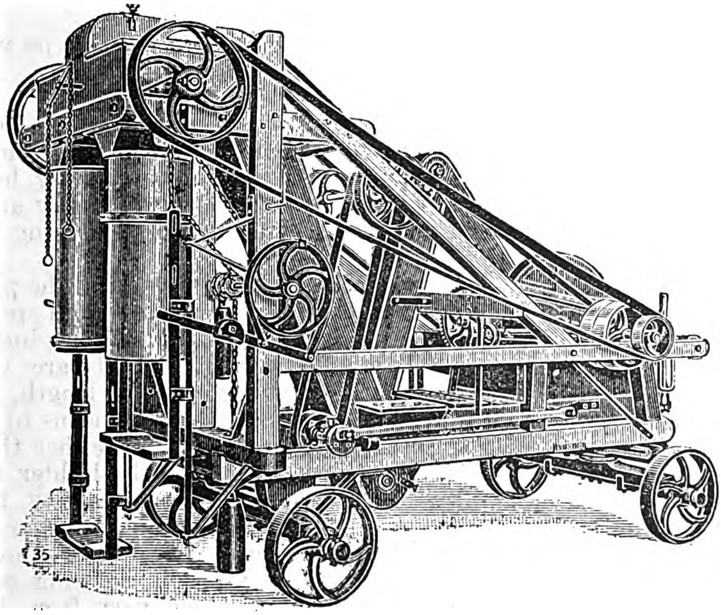

FIG. 23.—Portable chaff cutter, made in Australia.

crop, he must constantly keep his fallow lands well tilled. All farmers, therefore, must consider the raising of a crop for horse feed as one of the most necessary requirements of their operations, and this accounts for the large number of chaff cutters sold in Australia.

There are many types of chaff cutters in demand. All of them are of the flywheel type. One of the local manufacturers catalogues the following types:

Stationary chaff cutters suitable for driving with horse works or from shafting, when fast and loose pulleys are not required.

Stationary cutters fitted with loose pulleys, outer bearing, and striking gear, suitable for engine powers.

Stationary chaff cutters for farm or station use, with screen for screening chaff.

Stationary chaff cutters for chaff-mill use, where large quantities of chaff are cut and the work is particularly heavy.

Portable chaff cutters without screen, but with a fold-back elevator, having bagging attachment to enable user to run chaff into a room or into bags, this being used by farmers requiring to cut chaff in the field or at different positions.

Portable chaff cutters with screen, tailing elevator, and bagger.

Portable chaff cutters with shaking screen, tailing elevator, and automatic single-screw bagger to pack a heavy load of chaff into the bags.

Portable chaff cutters complete with shaking screen, tailing elevator, and automatic screw bagger.

Portable chaff cutters of the interchanging knife wheel type with shaking screen, tailing elevator, and double bagger.

Combined engine chaff cutters.

Attachments for chaff cutters that are largely in demand are automatic screw baggers, either single or double, with or without elevators; chaff screens, both circular and shaking, for screening large quantities of chaff; chaff elevators made in any length or any angle with or without intermediate baggers; hay steamers for steaming hay before it goes through the chaff cutter.

Feeders consisting of rollers regulated by levers to control the pressure seem to be the most popular type, preferred to those with spring pressure. The holes of the rollers are squared to take square spindles, which are preferable to round spindles. Knife wheels are very strongly constructed with center ribs running the full length, the knives being rigidly fixed to wheels and adjustable by means of set screws. The knife wheels are ordinarily provided with either three or four knives, though there are only two knives in the lighter machines. The question of providing the machines with safety feed rollers or drums, or some other positive arrangements, is generally carefully considered by intending purchasers. The size of mouth ranges from 6 to 12 inches, $8\frac{1}{2}$ and $9\frac{1}{2}$ inch machines being most widely sold. The lengths in which the chaff is cut vary from $\frac{1}{4}$ to $1\frac{1}{8}$ inches, the most popular sizes being $\frac{1}{4}$, $\frac{11}{32}$, $\frac{3}{8}$, $\frac{5}{16}$, and $\frac{7}{16}$ inches. The capacity of the chaff cutters sold ranges from 10 to 50 tons of chaff per day.

One of the distinctive features of the large chaff cutters sold in Australia is the hay steamer. The sheaves of hay are traveled through the steamer, where a series of jets of steam force a consistent amount of moisture throughout the sheaves before they are delivered at the feeding mouth of the cutter. This results in a much better sample of chaff than when water is used for damping. These steamers are supplied in various lengths to suit all requirements, although the standard length measures about 20 feet overall.

The weight of the wheaten or oaten chaff bag made in Australia is ordinarily 80 pounds, but special baggers are constructed that permit certain pressure to be exerted so that 120 pounds of chaff may be compressed into a bag.

A duty of 25 per cent; the high-class article turned out by the local manufacturers, who cater most carefully to the requirements of the country in every respect; the many types needed to meet the varying demand in different sections of the Commonwealth; and the general difference between the types manufactured in the United States and those desired in Australia—these are some of the factors that make it very doubtful whether American manufacturers could aim to supply any of these machines to Australia in satisfactory quantities. Efforts in that direction have been made from time to time, but always without success. It is not advised that American manufacturers should make any special efforts to enter that trade.

A small number of chaff cutters of the lightest type used in Australia, consisting of flywheel machines with two knives, are imported from England, and these, with the addition of a few machines imported from New Zealand, constitute the imports of chaff cutters into Australia. The bulk of the demand for these machines is supplied entirely by the local factories.

FEED GRINDERS AND CRUSHERS.

As has been indicated elsewhere, feed for horses, and often for other stock, is generally given in the shape of carefully made wheat and oat chaff. The demand for grinders and crushers, therefore, is not very large, although a good many of the implement merchants are prepared to supply these when required. Except in the corn-growing districts of New South Wales and Queensland, the majority of these machines are intended for the grinding of wheat, oats, and small grains.

Many different types are to be seen in Australia. The demand is supplied by local manufacturers, although England, the United States, and New Zealand also ship these machines to the Commonwealth. American manufacturers would not be justified in considering Australia an important market for the sale of these goods.

Feed grinders for all small grains, including peas, beans, barley, etc., designed to produce meal both fine and of various degrees of coarseness, are sold rather extensively. The most popular machines have a capacity of 15 to 25 bushels per hour and are suitable for operation with engines of 3 to 6 horsepower.

Small power flour mills are used by some farmers residing at a distance from flour mills, in order to make their own flour for domestic use. These machines are also required to grind cereals in various degrees of coarseness. Both stone and iron burr mills are sold.

Corn-and-cob crushers with fluted rollers of small size are sold in the corn-growing districts. Combined root cutters and pulpers are also in some demand.

SILOS AND ENSILAGE CUTTERS.

Because of the prevalence of long, dry summers in many parts of Australia and the periodical occurrence of droughts, the question of ensilage has of late been receiving increased attention in Australia, especially on the part of farmers engaged in dairying and in raising cattle and sheep. A great many farmers are also beginning to recognize the advantages of ensilage over field-cured hay kept in stacks in the field.

Owing to the impossibility of growing summer crops in many sections of Australia, ensilage will largely consist of oats, wheat, barley, beans, vetches, peas, and sorghums. The abundant yields of corn for ensilage purposes are beginning to be taken into consideration, and it is quite likely that this crop will be increasingly cultivated for ensilage wherever reasonable chances of success may exist.

The relatively high state of development of those Australian industries concerned with the supplying of farm machinery and equipment makes it extremely doubtful whether, if silos are ever extensively erected, imported makes will be largely supplied. In all probability local manufacturers will undertake to supply all the requirements.

Ensilage cutters are used in the few districts where ensilage is made at the present time, and so far nearly all the machines sold have been of American manufacture. As a rule, machines for engine power, with cylinders fitted with 11, 13, and 16 inch knives, and with a capacity ranging from 3 to 15 tons of ensilage per hour, are sold. Some of the larger machines are sometimes sold equipped with blowers.

TRACTORS.

The introduction of farm tractors in Australia has been accompanied by the same vicissitudes that marked the early sale of these machines in the United States and elsewhere. Several years ago, when tractors began to receive marked attention in this country, they were imported into Australia in some numbers. It was found, however, that the purchasers were, as a rule, not prepared or equipped to make a success of their operation. More than to any fault of the machines themselves, their failure must be attributed to the inadequate manner in which they were sold and put in the hands of the purchasers. This was, at least in part, due to the lack of provision made by manufacturers and importers for properly informing the owners with regard to the handling of the machines, and to the inadequate consideration given to the fundamental principles that should have been observed in placing machinery of an unknown type in the hands of the farmers. Most of the machines imported into the Commonwealth during what may be termed the "first period" in the development of the tractor business remain to-day as significant evidence not so much of their unworthiness as of the hasty and ill-advised methods that governed the first attempts to introduce them, This is to be sincerely regretted, for the advent of the smaller, more serviceable, simpler, and better tractor of to-day, with the enormous possibilities that are apparently open to it in Australia, is not so favorably received there on account of the injudicious policy in the past. Notwithstanding the favorable conditions existing in Australia for the tractors made to-day, their popularization will prove relatively difficult. The bitter lesson, learned alike by manufacturers, importers, and users, will not have been in vain, however, if it teaches more progressive, fundamental, and business-like methods in the introduction and sale of tractors such as American factories are turning out at the present time.

Time will undoubtedly confirm the opinion of many observers that Australia is one of the most attractive fields for the sale of American tractors. Nearly every condition is present to warrant such expectations. The extensive character of wheat growing is in itself a factor of great importance in this connection, for it can be safely said that more than 80 per cent of the cultivated area of Australia will probably prove economically adapted for their use. The methods of wheat growing in vogue in that country will enable the growers to perform all the necessary operations with one tractor—to the point that horseless farms may become a reality there.

It would be not only useless, but prejudicial and unfair to more progressive manufacturers as well, for any tractor maker to endeavor to market his product in Australia while leaving the entire burden of introduction upon the shoulders of the importer. Such a policy would be extremely harmful, so far as that country is concerned, to the future of the American tractor industry, which has raised such high hopes and holds such bright promise. There is danger that the confidence of the manufacturers in their own machines, based on an intimate knowledge of their construction, may obscure their realization of the fact that their machines at first will be entirely unknown and will constitute a very perplexing problem to foreign importers and users. It is very important, therefore, that they should be warned of this (even though, in certain cases, such caution may not be necessary), and that they should be prepared to instruct their foreign agents carefully during the introductory period. In most cases this will be impracticable unless competent men from the factories are sent wherever the machines are introduced, to remain for a reasonable length of time, with the object of instructing the agents concerning every phase of the tractors' work and operation, so as to insure the complete satisfaction of the ultimate buyer. To neglect doing this will prove disastrous to all concerned, and will render futile the hope of building up a permanent, substantial, and growing demand.

In spite of the adverse conditions brought about by the war (chiefly those having to do with the high cost and scarcity of cargo space), a rather large number of small-sized American tractors have been sold in Australia during the past three years. It is felt, however, that the difficulties likely to be met as long as present conditions continue will render inadvisable any great exertions for the time being, but it is to be hoped that as soon as such conditions disappear American manufacturers will look upon the Australian market as one worthy of their very best thought and attention.

Tractors of from 12 to 20 drawbar horsepower will probably prove the most popular and the best adapted to Australian requirements so far as size is concerned, although the country also offers good scope for the sale of a considerable number of larger machines. Quality will generally be a more important consideration, with most buyers, than low price, although it is not unlikely that at first low-priced machines will have a good run. The ultimate results, however, will undoubtedly justify the greater efforts that may be necessary to introduce an improved type of farm machinery, which in the long run has always proved to be preferred by Australian agriculturists. On account of the sandy character of the soil in many of the wheat-growing districts of Australia, machines possessing any special advantages when working upon such soils will probably be in greater demand than those that may prove unsatisfactory under such conditions. There seems to be a tendency in Australia to agree that machines with tracks will prove more acceptable than round-wheel tractors, but round-wheel machines will not be discriminated against if they prove capable of doing satisfactory work upon light sandy and wet soils. It will be well for American manufacturers to visualize the conditions under which tractors will work when operating machines of the stripper harvester type. Since only the wheat heads are taken off the crop the tractor will be called upon to travel over a heavy growth of straw, which will cause a good deal of slippage unless the wheels are fitted with suitable lugs. Machines that will successfully burn kerosene will also be preferred, although the difference between the cost of kerosene and gasoline in Australia is not so marked as in the United States.

It is difficult at this stage to indicate what class of firms in Australia will be best equipped to handle the tractor trade. The firms interested in the sale of agricultural machinery are generally very progressive, and in most cases they may prove quite capable of handling farm tractors. On the other hand, the firms engaged in the sale of motor cars, a good many of which also sell gas engines and other classes of machinery, might prove to be at least as well equipped to take up this business. Owing to the long terms that it will probably be necessary to give in the sale of tractors, the manufacturer should be satisfied concerning the financial resources of any intending agent and importer before giving him the agency. What is said in connection with the sale of gas engines in Australia should be considered at this stage. There appears to be every reason to believe that a group of gas-engine and tractor manufacturers could get together and successfully establish branch houses for the sole object of selling this class of goods.

Three or four Australian manufacturers have taken up the construction of farm tractors, and one of them has already succeeded in turning them out in fairly large quantities. One of the few discouraging features in this connection is that a duty of 30 per cent is paid upon imported tractors. It is felt, however, that the large-quantity production of the American tractor factories will enable them to compete successfully with the locally made machines so far as the cost of putting them in the hands of users is concerned, and it is also believed that American manufacturers will have another advantage in the fact that their machines will prove of greater general utility.

It is important that they should not ship any tractors to Australia until they are convinced that the machines have passed the experimental stage in every respect. Australia is too far away to test out any change that may be made on the tractors. It is much better to work along safe lines.

GAS ENGINES.

The statistics of imports given on page 65 speak rather favorably as to the demand already existing in Australia for gas engines. The past three seasons of unsettled conditions have not witnessed any decrease in this respect. Probably no other farm machine has been so consistently in demand there during that time—a fact that indicates the extremely wide opportunity for the sale of gas engines in Australia. Indeed, if conditions as regards the supply and cost of fuel were equally favorable, it might reasonably be hoped that the next few years would see the use of gas engines in Australia become relatively as extensive and varied as in the United States.

Every implement house and many other firms engaged in the sale of machinery other than agricultural handle gas engines. In spite of this it is felt that any American manufacturer making the type of engines demanded in Australia will find that country a most promising and profitable field, worthy of his best efforts, if he attempts to specialize in the sale of such machines. The sending of special representatives, and even the establishment of branch houses, can be recommended for his consideration, for along certain lines Australia offers an almost virgin field for the sale of gas engines. It is generally believed, for instance, that several thousand engines to run the internal mechanisms of stripper harvesters and binders could be sold in Australia if adequate efforts were made to acquaint the farmers with the many advantages of these machines for that work. Owing to the extremely varied demand, it would be desirable in that case that a complete line of engines should be represented, and several manufacturers under such circumstances might be able profitably to combine and join their efforts in promoting a business solely concerned in the sale of gas engines.

Vertical and horizontal engines in sizes ranging from 1½ to 15 horsepower are sold, the heaviest demand being for 4 and 6 horsepower machines. Almost every kind of engine manufactured is sold in Australia, and while there seems to be a preference for high-grade machines a good many cheap engines are also sold. In the large sheep stations, for instance, where sometimes dozens of engines are used for pumping purposes, the question of price is often a consideration of moment and in some cases the cheapest engines are imported for that trade, although as more experience is had with them a tendency toward a better product is observed. Engines such as are ordinarily sold to farmers in the United States are in great demand for farm work, and these, on the whole, may be classed as the intermediate type, being medium or moderate priced machines. In connection with dairying and irrigation and for industrial purposes a high-class engine is generally preferred, and the demand for these so far has been largely supplied by English manufacturers.

The fuels used in gas engines in Australia can be said to be equivalent to those used in the United States. The cost of these in the former country is normally about double that in the latter, while during the past three years it has been about three times higher. The fuels used range from low-test kerosene to high-test gasoline, there being but little crude oil used in Australia in connection with the operation of gas engines.

Ordinarily the gas engines manufactured in the United States are satisfactory for the Australian trade. Good cooling and accessibility of the water jacket, to permit of easy cleaning, are desirable features. The former requirement is advantageous because of the high temperatures prevailing in Australia during the summer months, whereas the latter is desirable on account of the waters being often highly mineralized.

Several Australian firms manufacture gas engines. While these turn out a rather satisfactory product, it is felt that they will not become an important factor in supplying the demand—at least for some time to come.

The large number of engines imported from the United Kingdom indicates that substantial, heavy, and well-constructed engines are in great demand, for it is well known that thus far English manufacturers have not taken up the construction of engines to meet the demand for low-priced machines. The demand for some of the better American engines, however, is rapidly increasing, and on the whole it is felt that Australia may be regarded as a very promising field for the sale of American gas engines.

ENGINE SPRAYING OUTFITS.

Two-nozzle outfits equipped with engines of 1 to 2 horsepower and spraying pump, and mounted on 4-wheel steel trucks, are being used by many orchardists. American outfits are very popular and largely supply the demand.

STEAM ENGINES.

Gas engines are rapidly taking the place of steam engines whenever motive power is used in connection with the work of agricultural machines—so much so that very few implement importers handle the latter. A fair number of steam engines, however, is still in demand to operate chaff cutters and similar machines, but no American machines at all are to be seen in this connection. Some portable and traction steam engines manufactured in the United States were imported several years ago, but from all indications they failed to appeal to buyers of these goods. The trade prefers the type of steam engine supplied by the United Kingdom and the machines that are beginning to be constructed locally.

The trade in steam engines is largely in the hands of general and industrial machinery firms, and it is considered rather as a separate business from that of selling agricultural machinery. Nowhere in Australia did the writer hear anyone express a belief that American manufacturers of steam engines would find that country a ready market for their goods.

CREAM SEPARATORS.

The average value of Australia's annual imports of cream separators is $400,000. About 80 per cent of this trade is controlled by Swedish manufacturers. Belgium, the United Kingdom, and the United States supply the remainder of the demand. As is well known, the Swedish manufacturers were the pioneers in seeking the cream-separator trade of the countries not producing such machines, and Australia has been given considerable attention by them since that country first began to develop its dairy industry. They have consistently supplied a meritorious article sold at reasonable prices. Their position to-day, therefore, is extremely strong, and American manufacturers, even those producing a superior article, will find it exceedingly difficult to wrest from them any substantial share of their trade in the Commonwealth. Some of the machines sold are so extensively and favorably known that the importers doing the bulk of the cream-separator business of Australia have contracts with the manufacturers running for a long term of years. It is obvious that the dealers will not give up handling these well-established machines to take up the sale of cream separators which, even though they may be better machines, will be unknown in Australia. Cream separators, furthermore, are generally sold on long terms of credit and on the deferred-payment plan and are installed by experts in the employ of the local dealers in the country districts. While all the implement importers in the dairying districts handle these machines, most of the business is done by a few large firms specializing in the sale of dairying appliances.

If these difficulties in introducing new makes of cream separators could be overcome, it is felt that the superior machines made by several American factories would meet with a hearty acceptance by the dairymen of Australia. To develop a satisfactory demand for them in Australia would require, however, considerable expenditure and exertion on the part of the manufacturers, for they would undoubtedly find the farmers averse to experimentation. A great deal of demonstration work would, therefore, be required, and unless the manufacturers established their own retail branches they would probably be compelled to create a substantial demand by their own efforts before they could induce the large importers to discontinue the sale of the goods handled by them and take up the sale of the new product. The possibilities for the sale of cream separators in Australia appear so vast and promising that this field seems worthy of increased attention on the part of such American manufacturers as are ready to display the required enterprise and patience.

In the statistics given on page 59 it will be seen that the dairying industry is largely confined to the States of Victoria and New South Wales, though in Tasmania and Queensland it is making very satisfactory progress.

Both hand and power machines are used. The former are in demand in sizes having a capacity of from 8 to 70 gallons per hour. The latter have a capacity of from 35 to 150 gallons. A number of separators of a capacity up to 700 gallons per hour are sold. The trade is fairly well divided among many different makes. In the districts where dairying is a new industry small separators of a rather inferior quality are sold, but in the districts where it is well established the preference is decidedly for high-grade machines.

MILKING MACHINES.

The demand for milking machines is constantly increasing, and many hundreds of these are sold every year. The trade is supplied with machines made in Australia and New Zealand, where their manufacture has attained a great degree of efficiency. In both workmanship and efficient working they would stand most favorable comparison with the machines manufactured outside of Australia. It is doubtful, therefore, whether American manufacturers can offer their machines to Australian importers with much chance of success. The machines sold are for milking two, three, four, or five cows at a time and capable of milking about 18, 25, 35, and 45 cows per hour, respectively. Gas engines of the most improved types are sold in connection with milking plants.

OTHER DAIRYING REQUISITES.

Several makes of wood churns are on the market, but the product of a local factory exclusively engaged in the manufacture of these articles has become almost the only line extensively sold. The churns made by this factory comprise several designs capable of producing from one-quarter pound to 1,000 pounds of butter. Their high price is not a formidable obstacle to their sale, because of the extensive advertising and the undoubted quality of the product. New Zealand kauri wood is used, this being a remarkably clear pine entirely free from knots and blemishes, easily worked, and requiring no other external finish than transparent varnish.

Before the advent of the cooperative butter factory in Australia barrel churns were imported and made in Australia in large numbers, but these are now altogether unsalable.

An American manufacturer of metal butter workers is successfully introducing these in Australia. The milk container and agitator are of heavy tin, while the cover, gearing, and other parts are made of iron with metal finish. The machine has ball bearings throughout, is noiseless, and is so easy to work that it is claimed butter can be produced in five minutes. The only wood is in the handle; therefore it is easily cleaned and kept sanitary.

The sale of small glass churns is not particularly active, but they are regularly imported by a number of firms. Prior to the war glass churns were imported chiefly from Germany and Scandinavia, but of late the supplies have been coming from the United States.

Cream and milk cans in 3, 5, 8, and 10 gallon sizes are in great demand. Seamless-steel nickel tinned cans, without joints and with rounded corners, are particularly in favor. The local factories supply the demand very largely, but some high-grade cans are imported, chiefly from Denmark.

FARM WAGONS, TRUCKS, AND CARRIAGES.

The wagon and coach building trades of Australia employ 7,403 persons in 814 factories, which produce an annual output valued at more than $7,500,000. These figures indicate that this Australian industry is highly developed, and in view of that fact it is practically impossible for foreign manufacturers to compete with the local makers. No farm wagons and vehicles are imported, therefore, to any extent that would justify American manufacturers in turning their attention to the Australian trade.

If a farmer could be educated to look to the farm-machinery importer instead of to the local wagon manufacturer for these goods, it is not improbable that a good many steel farm trucks could be sold in Australia. In that event the American manufacturers might hope to participate largely in the trade, at least until local manufacturers became ready to compete with them for that business.

Steel trucks are imported to some extent, and American manufacturers are receiving the bulk of the business. The Australian users demand an article of high quality and in types ranging from 1½ to 5 tons capacity. Strong wheels are a necessity, and these are furnished of steel as well as wood. In the former case they are 30 and 38 inches in diameter for front and rear, respectively, while wood wheels are generally wanted measuring 40 and 44 inches, respectively. Turn-under all-steel trucks with front wheels 36 inches and rear wheels 48 inches are also imported to some extent.

WINDMILLS.

Concerning no other product used by farmers in Australia was it so difficult for the writer to secure satisfactory information as in the case of windmills. The import statistics of the Commonwealth do not permit one to obtain even an approximate idea of the value and the origin of the windmills brought in. The largest implement houses of Australia do not handle windmills, and while many of the smaller ones do so they do not seem to be aggressive, as a rule, in pushing their sale.

In view of the extent and importance of the pastoral industries of Australia, it is obvious that a good many windmills are sold in that country. While in certain districts the stock is watered with artesian supplies, there are vast areas of country where water is found sufficiently near the surface to render the windmill an economic asset in pumping water for stock and domestic purposes. Wherever windmills are used in the sheep and cattle stations it is not uncommon to find that several dozen windmills are used in single holdings. Many of the rural towns, moreover, do not have community water supplies, and in such cases windmills are extensively used to obtain water for domestic purposes. It must be noted in this connection that small gas engines have undoubtedly taken the place of windmills where the winds are not reliable enough to insure a continuous supply of water.

Some American makes of windmills are sold extensively in Australia, and these goods are also imported from the United Kingdom and Canada. Several Australian firms also manufacture them and are said to be making good progress in supplying the requirements of the country.

All windmills sold in Australia are steel mills, and those most widely in demand have 8, 10, and 12 foot wheels, although mills with 14, 16, 18, and 20 foot wheels are also sold. The length of stroke ranges from 7 inches in the smaller sizes to 14 inches in the largest. The towers almost invariably consist of four steel posts in 20 and 30 foot sizes, though 40 and 50 foot steel towers are sold in certain districts.

While the entire windmill situation is rather complex, it is suggested that American manufacturers would do well to give greater attention to the possibilities of the Australian market than has been the case hitherto.

PUMPS.

American pump manufacturers are well represented in Australia, where their goods are extremely popular and in great demand. They enjoy a commanding position in the trade, so far as the agricultural and pastoral business is concerned. Every known type of pump is found in the Commonwealth, and to attempt a complete review of the requirements and the trade would require considerable special effort and time. American manufacturers will undoubtedly find Australia a market worthy of their best efforts.

OVERHEAD SPRINKLERS.

The overhead method of sprinkling has become very popular in certain sections of Australia for the growing of truck, alfalfa, fruit, and similar crops, and some very large installations are often to be seen. While the outfits sold are chiefly of local manufacture, American makers of complete sets of parts would probably find it advantageous to give some attention to the Australian demand.

HORSEPOWERS.

One, two, and three horsepowers are extensively used in Australia. The demand is for unmounted horsepowers with intermediate gearing for increasing speed from 7 to 1 to 30, 35, and 45 to 1. These are wanted for pulley and belt work as well as to be driven direct. They are largely used for small chaff cutters, grinders, and similar machines. The bulk of the demand is for locally made machines, but imported machines are also largely sold.

SAW FRAMES.

Saw frames are to be seen on a great number of farms. Tilting or swinging frames for sawing poles, cordwood, etc., with interchangeable pulley and balance wheel, wood or steel frames, for blades 20 to 30 inches in diameter, are made locally and also imported.

GRADERS, SCRAPERS, AND SCOOPS.

Road graders for horse and engine power, 3½ and 4-foot steel scrapers for horse power, and scoops of pressed steel in 3, 5, 7, 10, and 13 cubic foot capacity, are sold quite extensively in Australia.

FENCING AND GATES.

Owing to the importance of the sheep and cattle raising industry, it is obvious that there is a considerable demand for fencing. Dingoes (wild dogs) and rabbits are also pests against which protection must be provided.

Sheep and cattle proof fencing ordinarily consists of six wires of 12½ to 16 gauge, spaced 6, 6, 6, 9, and 12 inches, the bottom wire being 6 inches from the ground. This gives the fence a height of 3 feet 9 inches. The top wire is generally barbed, although plain wires are often used on top. Posts are usually made of local woods, being ordinarily set 10 feet apart. In some cases the wood posts are placed 22 feet apart and two droppers set at equal distances from the posts.

Dog-proof fences are generally constructed as follows: 36 by 4 by 16 gauge 2½ or 3-foot netting, one 14-gauge barbed wire flush with ground, one 12½-gauge wire 3 feet from the ground, one 14-gauge barbed wire 6 feet higher, and one 12½-gauge wire 6 inches above the barbed. Netting for dog-proof fencing is generally supplied in rolls of 100 yards.

Rabbit-proof fencing is either 42 by 1½ by 18 or 42 by 1½ by 17 gauge netting.

Poultry, pig, and other types of fencing generally used in fields and farmyards are largely sold in Australia.

Single gates in 8, 9, 10, and 14 foot sizes and double gates for 10, 12, 14, and 16 openings, ordinarily 4 feet high, are also in great demand, for both field and homestead. The types used vary considerably.

SHEEPSHEARING MACHINES.

While it is not considered advisable to attempt an extensive review of the demand for sheepshearing machines in Australia, the attention of American manufacturers is directed to the fact that the Commonwealth is one of the largest users of all types of these machines. The lines on the market are confined to the product of one American and two English factories. Pastoralists are extremely discriminating in purchasing sheepshearing machines. The slightest advantage or improvement will immediately be reflected in a shifting of the demand from one machine to another, although the machines on the market are considered to have attained a very high degree of perfection and little change is taking place now in their construction. Most of the machines purchased are intended to be operated by gas engines. The demand for hand-worked machines is rather small. When no engine-operated shearing machines are used, plain hand sheep shears are in demand.

IMPLEMENTS FOR SUGAR-CANE GROWING.

Australia offers great possibilities for labor-saving machines suitable for the various operations required by sugar-cane growing. The labor situation prevailing in the sugar-cane fields, and the fact that there is a pronounced tendency to employ white labor exclusively, will cause an immediate demand for machines that will enable the planter to expedite his operations and reduce the number of his laborers. Cane planting and cutting machines will find, therefore, a ready market in Australia, and American manufacturers evolving satisfactory machines for such work will do well to consider the Australian market. Several small factories in Queensland are making efforts to develop machines of this kind, and foreign manufacturers intending to take an interest in Australia will find it necessary to take steps to prevent the copying of their machines in that country. It will also be nesessary for them to be prepared to demonstrate the utility of their machines, as a great deal will depend upon satisfactory work when they are first introduced.

VII. TRADE METHODS AND SUGGESTIONS.

It is rather difficult to summarize the factors connected with the Australian demand for agricultural machinery in such a way as to indicate to American manufacturers the most advisable course to pursue in order to participate adequately in that trade.

It has been seen, on the one hand, that the Commonwealth is rapidly and successfully developing its agricultural resources. It has vast areas of land susceptible of profitable cultivation, as well as thrifty, intelligent, and progressive farmers thoroughly accustomed to the use of modern farm machinery. On account of the small rainfall, the soil conditions, and the prevailing system of farming, the extensive use of machinery is a necessity. The labor situation causes the farmers to use time and labor saving appliances to the largest possible extent. Finally, the local manufacture of farm machinery is beset with many and increasing difficulties, owing to labor conditions and the high cost of production.

On the other hand, it is found that Australia is determined to protect the domestic manufacture of farm machinery by means of a very high tariff on foreign goods; that the local manufacturers ordinarily undertake the construction of foreign-built machines as soon as it has been proved that a permanent demand for them has been created; that, while the general design of American-built machines meets with much approval, the trade requires machines of a somewhat heavier construction than are necessary for the trade in the United States. To this must be added the intense loyalty of the Australian population to British-made products, with the result that, ordinarily, American goods are purchased only when they can be obtained on decidedly more advantageous terms than similar British articles. Also, with a few exceptions, the demand for foreign-built farm machines is restricted to those required for the secondary crops cultivated in Australia, and this limited field does not give much scope to foreign manufacturers for an aggressive effort to sell their goods. Machines for wheat growing, the only really important agricultural industry of Australia, are almost entirely of local manufacture.

The prevailing trade practices, moreover, including the giving of long terms of payment, have had the effect of concentrating the business in the hands of the local implement manufacturers and the local branches of two foreign firms. The existence of firms solely engaged in the importation of this class of goods, not connected with local or foreign manufacturers, and buying strictly for their own account and at their own risk, has, therefore, become rather unsatisfactory and they are consequently at a disadvantage in pushing energetically the sale of the lines that they import. It must also be considered that farm machinery has been in common use throughout

Australia for many years. All farmers are well supplied with such machines as they can advantageously use. There are, therefore, few undeveloped branches of the implement business, and the strong firms that command so much of the trade have always been fully awake to the opportunities for manufacturing or importing any new lines that the Australian farmers have seemed inclined to use extensively.

A review of these circumstances suggests that there are only two courses open to American manufacturers. They must either undertake the establishment of very strong selling organizations in Australia by opening their own branch houses, or they must adopt a rather passive policy as regards obtaining business in that country.

BRANCH HOUSES.

If any firms or group of firms conclude to enter the Australian implement field aggressively by establishing branches in the Commonwealth, they must be prepared to conform their sales and credit policy to the local customs. They should be ready to change their machines so as to adapt them thoroughly to Australian requirements. They should also consider the construction of certain machines extensively used in Australia, provided a careful study of the market, of local manufacturing conditions, and of the tariff indicates that they would be able to compete profitably with those already well established in the market. It might be worth while for them to consider, in this connection, the advisability of establishing branch factories in Australia with the object of assembling and completing machines there whenever the provisions of the tariff enable them to import a sufficiently large proportion of the parts under the classification of raw materials (or at least with lower duties than complete machines or finished parts thereof). Close cooperation between the American parent factory and the Australian branch factory might lead to satisfactory results if such a suggestion should otherwise prove practicable.

It should be distinctly understood that the establishment of branch houses in Australia is only advised as a last resort, and that the outlook is not regarded as especially encouraging. Only through the greatest interest in Australian trade, the most intense effort and energy, and the investment of a very large capital can success be attained by this method. It would seem that American manufacturers could find other foreign fields that would more readily and profitably respond to effort and investment of this character.

PROBLEMS INVOLVED IN INTRODUCTION OF GOODS.

The meager possibilities of the Australian market, the relatively small importation of American machines, and the fact that Australia is the reverse of an undeveloped field—these are factors not calculated to encourage many of our manufacturers in undertaking the effort and expense of sending special representatives to the Commonwealth to develop a demand for their goods. The only trade that could be cultivated by such representatives would be that of the firms solely engaged in importing machines of this kind and that of the local manufacturers who may desire to order a few machines which, not being largely used as yet, are imported by them in order that they may be able to offer a complete line to their customers. This trade is, as a rule, rather unimportant. American manufacturers, therefore, would be generally quite justified in adopting an attitude of caution. There are very few manufacturers in the United States who make enough machines suitable for Australia (and sold there in large numbers) to warrant their keeping one of their representatives in the country continuously. And that method is coming to be recognized as the only satisfactory way to insure the retention of a steady and permanent demand for farm machinery, once this has been created.

It is impossible, of course, to give practical suggestions to meet all circumstances. Each manufacturer must solve these problems for himself, and only a few factors of a general character can be incorporated in a discussion of this kind. What has already been said, however, will probably be applicable in the great majority of cases, and it is deemed advisable to sound a note of warning to anyone considering the expenditure of much energy or the investment of much money in efforts to develop a trade in the Australian market.

Whenever a manufacturer produces a line that he feels can be sold in Australia in satisfactory quantities, it is obvious that the best procedure is to have it introduced by one of his own representatives. He will find it greatly to his advantage to thoroughly satisfy his agents and prospective agents concerning the merits of the machines and to assist them for a reasonable length of time in demonstrating the goods and otherwise bringing them to the favorable attention of intending users. This method has always been productive of the best results. Despite the proverbial enterprise of the Australian importers of farm machinery, it must be understood that one of the outstanding characteristics of the Australian people is their tendency to view with caution any decided change in methods or any unknown article. Under these conditions, close cooperation between the manufacturer and the importer is essential in introducing a new class of machinery.

It is suggested that one solution of the question of manufacturers' representation in Australia can be found in several manufacturers combining to send capable representatives to Australia to look after their common interests. A complete line of such machines as are made in the United States, and for which there is more or less demand in the Commonwealth, should be represented in such combinations. The amount of business that an individual manufacturer can hope to develop in Australia by sending there a representative solely to sell his own goods will, in most cases, prove inadequate to compensate him for the efforts and expenses involved. When the total imports from the United States are considered, together with the fact that a single American firm probably contributes about 75 per cent to these totals, it will be readily seen that the other American manufacturers operating in Australia do individually too small a volume of business to justify the expenses of a personal representative.

COOPERATION WITH AGRICULTURAL INSTITUTIONS.

It will have been observed throughout this report that Australia's agricultural progress has developed along certain distinctive lines of its own. This is largely due to the outstanding physical characteristics of the country, which have made necessary the adoption of practices for which it would be difficult to find a parallel elsewhere. On the whole, Australia has made a remarkable success of the agricultural practices it has evolved, and there is undoubtedly much that the farmers of other countries could advantageously learn from the Commonwealth. In every phase of wheat growing, for instance, it would appear that the Australian methods could scarcely be improved upon under like conditions.

On the other hand, in the less important branches of farming—those that have not received much attention from Australian farmers hitherto—it is not improbable that a great deal could be accomplished, in the interest of all concerned, if American manufacturers cooperated with the institutions that Australia maintains for the promotion of agriculture. At the present time there seems to be a good opportunity to experiment with a view to convincing the Australian farmers of the utility of small gas engines in operating the internal mechanisms of strippers, stripper-harvesters, reaper-thrashers, and binders. Farm tractors, ensilage machinery, and all types of machinery made for the cultivation of corn also offer a field for activities of this character. As already indicated, there seems to be a great future in Australia for all these lines, but it will be necessary to do a great deal of educational and experimental work to prove the efficiency of the machines before the farmers will attain a substantial appreciation of their advantages. The value of the work done by Australia's agricultural colleges and experimental farms has served to give great prestige to these institutions. They are very close to the farmers, who look to them for advice, guidance, and inspiration. If machines or appliances can be offered to the farming community with an indorsement from such institutions to the effect that they have proved satisfactory under Australian conditions, or that they are used in connection with the actual agricultural operations conducted by the institutions, this will be one of the most powerful and effective arguments that can be used in selling them. Whenever practicable, therefore, American manufacturers are advised to make it possible for these institutions to become acquainted with the value of any machines that it may be desired to introduce in Australia. There is little doubt that they will be repaid for their efforts, either with a large demand for their goods or with practical and valuable suggestions as to what may be required for the attainment of that end.

COMMISSION REPRESENTATIVES.

Next to a combination of manufacturers for the purpose of sending a representative to Australia to devote his entire efforts to the sale of his principals' goods, one may suggest making arrangements for representation by a firm established in Australia. There are one or two firms that have made a decided success of a business of this character, considering the limitations of the Australian market. They have had in their employ men well versed in farm machinery, who have visited the trade at regular intervals to obtain orders for goods already known or to introduce new lines. The firms in a position to represent manufacturers successfully on this basis are very few, but in the majority of cases the manufacturer can consider himself fortunate in being represented by them.

CATALOGUES, CORRESPONDENCE, AND TRADE PAPERS.

Owing to the difficulties attending the entering of the Australian market by other means, it is obvious that a very extended use will necessarily be made of catalogues and correspondence to feel out and even establish actual relations with Australian importers. The remarks made in this connection in the writer's South African report (Special Agents Series No. 146, p. 160) may be regarded as entirely applicable to Australia.

With a few notable exceptions, most of the American agricultural machines now sold in Australia were first introduced there as a result of the alertness of the importers of that country, most of whom receive the farm-implement papers published in the United States. Whenever these journals have published articles or advertisements of machines that the importers felt could be sold in Australia they have taken the initiative by writing to the manufacturers in order to satisfy themselves further concerning the adaptability of the machines to Australian conditions. In many instances orders have subsequently resulted.

It may be said in this connection that Australian farm-machinery merchants regard the United States as the country that produces the machines yielding the greatest results for the minimum of effort and operating cost, even though they may often doubt whether the general construction will be strong enough to meet satisfactorily the requirements of their trade.

SALESMEN.

The observations in the writer's South African report (p. 162) concerning the essential qualifications of salesmen intrusted with foreign work are entirely applicable in Australia.

As in most foreign countries it is very important that the salesmen should have the virtue of patience. Australian business men have somehow gained the impression that American salesmen do not appreciate the fact that, in making a connection with an overseas firm, an importer must be given the opportunity to consider the proposition carefully and to obtain an idea of the character of the firm by observing the attitude of its representative. It is to be recommended, therefore, that salesmen should be considerate in this connection and should feel that the foreign merchant will often expect the salesman to reflect, by his methods and attitude, the outstanding characteristics of the firm he represents. Impatience, the desire to close a deal hurriedly, and insufficient consideration for the interests of the buyer are things to be absolutely avoided in dealing with Australian business men. The firm whose business is sought must be given an opportunity to become fully satisfied as to the character of the goods sold. The buyer requires and appreciates thorough information concerning the construction and operation of the machines and the best way to sell them.

EXPENSE ALLOWANCES.

The Australian hotels will probably be found somewhat more up-to-date than those of South Africa, though the charges are no higher.

American salesmen are advised to consider the benefits to be derived from joining one of the commercial travelers' associations of Australia. There are such organizations in every State of the Commonwealth, and they exchange with each other the privileges to which their members are entitled. Such membership will enable the traveler to obtain the special rates given by the railways and hotels to members of these associations. Clubhouses with residential facilities, including rooms and restaurants, are maintained by the associations in nearly all the State capitals of Australia. The rates charged for such services are reputed to be lower than those charged by the leading hotels, the service being equally satisfactory. The impression was gained that it will not detract from the prestige and dignity of the salesmen to reside in these clubs instead of taking up quarters at the leading hotels.

The writer's South African report (p. 164) may be referred to for further suggestions concerning the expenses of salesmen.

TAXES PAYABLE BY COMMERCIAL TRAVELERS.

The remarks under the heading "Taxation" in the report "Exporting to Australia" (see p. 135) should be considered. Since the law taxing agents and travelers selling goods in Australia for foreign firms was recently enacted, it is recommended that representatives of American firms make it a point to confer with the American commercial attaché at Melbourne in regard to the requirements.

AGENCIES—TENTATIVE ROUTES FOR SALESMEN.

Each State of the Commonwealth can be considered a distinct and separate unit as regards the area of territory that should go with each agency appointed. It should be remarked, however, that several Australian firms engaged in the sale of farm machinery have branches in several Australian State capitals, and it would be quite proper to give such firms the exclusive right to sell a line of goods in all the States in which they have offices or branches.

As already indicated, the six capital cities—Sydney, Melbourne, Adelaide, Brisbane, Perth, and Hobart—constitute the chief trading centers of Australia, and the importers located at these points are generally prepared to cover adequately the whole of the territory within the respective States.

Both Melbourne and Sydney are advantageously situated to serve as the headquarters of American salesmen engaged in developing a demand for farm machinery in Australia. The richest agricultural districts are closely adjacent to these two cities, and the other trading centers are connected with them by both railway and steamer services. Before visiting Western Australia it might be advisable to consider carefully the prospects of doing business there; it is hoped, however, that the increasing agricultural activities in that State will, in most instances, justify the trip.

INVOICING.

Manufacturers exporting goods to Australia are urged to observe carefully the requirements of the Commonwealth customs authorities in regard to the declarations to be inserted upon all invoices covering shipments to that country. The principal requirement is that the values be stated in accordance with certain rules and that an accurate trade description of the goods shipped be given. The following declaration has been accepted as correct by Australian customs officials:

Domestic cash value f. o. b. factory, excluding casing; cash and quantity discounts deducted------------------------------------

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--- $----------

Inland freight--- $----------

Cost of outside casing--- $----------

I, ------------------------------ of --------------------------------, have the means of knowing and do hereby declare:

1. That I am the manager of billing department of the exporter of the goods in the within invoice mentioned or described;
2. That the said invoice is in all respects correct and true;
3. That the said invoice contains a true and full statement showing the price actually paid or to be paid for the said goods, the actual quantity thereof, and all charges thereon;
4. That the said invoice also exhibits in a separate column the actual price *at the date of this declaration* of equal quantities of identically similar goods to any purchaser for home consumption in this country;
5. That no different invoice of the goods mentioned in said invoice has been or will be furnished to anyone; and
6. That no arrangement or understanding affecting the purchase price of said goods has been or will be made or entered into between the said exporter and purchaser or by anyone on behalf of either of them, either by way of discount, rebate, salary, compensation, or in any manner whatsoever other than as shown in the said invoice.

Signature --.

Witness ----------------------------------.

Dated at ---------------- this ---------- day of ----------------, 191--.

Much of what is said in the writer's report on South Africa (p. 170) in respect to invoices and packing lists applies to Australia. The report "Exporting to Australia" (see p. 135 of this monograph) will give further valuable information in this connection.

SHIPPING.

Owing to the difficulties existing at the present time in connection with shipments to Australia, it is suggested that American manufacturers take the utmost personal interest in forwarding their goods under conditions as advantageous as possible for their customers in that country; this applies not only to cost of freight but also to efforts calculated to insure the arrival of the goods at their destination when required. Manufacturers should keep their agents well informed regarding any delays occuring in forwarding the goods, and when they know definitely the name of the steamer and the approximate date of sailing this information should be communicated to the customer at once. If only a part of a shipment has been taken by a steamer the foreign importer should be notified of this fact and should be told as nearly as possible the time when the remainder of the shipment will go forward.

Some complaints have been made by Australian importers to the effect that American manufacturers, as a rule, do not take enough interest in securing the best possible shipping service for their customers. They claim that, because the importer generally pays the freight, the manufacturers do not exercise as much diligence in obtaining better rates and quicker shipment as they would if the freight were for their account. Obviously, it is to the interest of the manufacturer to have his goods arrive at destination with the lowest possible cost to the importer, so that the latter may be enabled to make good profits (which will be an incentive for him to push the sale of the goods) and to meet the prices at which competitive machines may be sold.

CREDIT INFORMATION.

Mr. William C. Downs, former United States commercial attaché at Melbourne, has the following to say with regard to the facilities for obtaining credit information concerning Australian concerns:

> It is not at all difficult for an American manufacturer or merchant to satisfy himself as to the financial standing and responsibility of Australian firms. The facilities for obtaining such information may be briefly summarized. Twenty-four banks of international scope have branches in all the principal cities of Australia and are in relation as correspondents with banks in nearly every city of the United States. [A list of these banks and their American correspondents may be obtained from the Bureau of Foreign and Domestic Commerce or its district or cooperative offices. Refer to file No. 563.] No reputable firm will hesitate to give as reference the name of the bank or banks with which it has transactions. The principal American mercantile agencies have chains of branches and agencies throughout the country and can furnish the customary reports to their subscribers. The various associations of manufacturers, such as the National Association of Manufacturers and others, have collected a mass of credit information for the use of their members, and, lastly, the local sales agents can supply intimate personal knowledge, based on experience, as to how different firms conduct their business. By making use of these various sources of information, a manufacturer or merchant can easily determine whether or not a firm is deserving of credit.

With a very few exceptions, the Australian firms engaged in the importation of farm machinery have been established for many years. As a rule they are very important concerns, with ample capital, and managed by men of experience and ability. Most of these houses are also interested in other lines of business, such as hardware, iron and steel goods, general merchandise, etc. Should the question of arranging terms of payment other than cash in New York arise, American manufacturers should carefully consider the matter, availing themselves of the ample facilities for obtaining credit information. It is felt that in the majority of cases the manufacturer will decide wisely to cooperate with his agents in this regard.

Persons who desire information concerning the usual method of financing sales to the Commonwealth should consult "Exporting to Australia," Miscellaneous Series No. 45, obtainable for 5 cents from the district offices of the Bureau of Foreign and Domestic Commerce or from the Superintendent of Documents, Government Printing Office, Washington, D. C.

ADVERTISING.

Much of what is said in the writer's South African report (p. 173) in reference to advertising will fit Australian conditions. English is the only language spoken in Australia. It must be noted, however, that the spelling of certain words is in accordance with the British practice and that the general phraseology also corresponds to that of the mother country. This should be taken into account in preparing advertising matter for the Commonwealth.

A good many Australian importers of farm machinery expect the manufacturers to supply them with specially printed leaflets suitable to be attached to their loose-leaf catalogues. It is recommended that the wishes of the importer in this connection be complied with as far as possible. This should be done, however, only when the importer makes a special request to that effect. In that case accurate information should be had as to the size of the sheets and the punching, so that they will properly fit into the loose-leaf books.

WEIGHTS, MEASURES, AND CURRENCY.

The weights and measures used in the United States are employed in Australia. The hundredweight of 112 pounds and the ton of 2,240 pounds are largely used, however, as weight measures. American shippers do not need to take this into account unless there is some special reason or they are requested to do so.

The coinage used throughout Australia is the same as that of Great Britain.

POSTAGE.

Numerous complaints were heard in Australia in regard to the receipt of letters from American manufacturers with short postage. When this occurs the recipient is called upon to pay double the amount short, so that, whenever a letter reaches Australia with only a 2-cent stamp, 6 cents will be collected when it is delivered. It is obvious that when this happens a prejudice is at once created against the methods of the manufacturer, and this will operate against a sympathetic consideration of the contents of such letters.

The rate of postage on first-class matter sent from the United States to Australia is 5 cents for the first ounce and 3 cents for each additional ounce. Similar postage from Australia to the United States is 5 cents per half ounce.

DUTY ON CATALOGUES.

Australia levies an import duty on catalogues and advertising literature, whether entered in bulk or by post. Many American manufacturers have had trouble owing to their unfamiliarity with this feature of the Commonwealth customs regulations. Their catalogues have been refused or have been returned because of accrued customs duties that Australian firms have declined to pay. It is recommended that American manufacturers prepay all charges on advertising literature, including duties, in order to insure full effectiveness for their trade-promotion work in Australia.

Catalogues, price lists, trade circulars, and advertising matter are subject to a duty of 20 cents per pound or 35 per cent ad valorem (whichever rate returns the higher duty) on arrival at Australian customs. The same duty is levied on catalogues, etc., sent by mail, even when forwarded in single copies addressed to individuals, whenever the quantity sent to any one State of the Commonwealth can be assessed at more than 1 shilling duty.

Duties on advertising literature mailed to Australia may be prepaid by buying customs duty stamps at the Commonwealth office in London, or by remitting directly to the Australian postal authorities for transmission to the customs.

As regards packing, instructions for setting up and operating implements, and repair-part lists nothing can be added to the remarks made under these headings in the writer's report on South Africa (pp. 168 and 169), and manufacturers are referred to that monograph (Special Agents Series No. 146) for suggestions in this connection.

OCEAN FREIGHT SERVICE AND RATES.

San Francisco and Vancouver are decidedly the most favorably situated ports on the American continent in relation to Australia. They are, respectively, 6,511 and 6,769 miles distant from Sydney. Most of the farm-machinery factories, however, being situated in the Eastern and Middle Western States of the United States, find their natural seaboard outlet through the port of New York, and it is from that port that the bulk of American farm machinery is shipped to Australia, and will continue to be, at least for some time to come.

The construction of the Panama Canal will prove of great value to American exporters to Australia. It places Sydney 3,509 miles nearer to New York than via the Suez Canal, and 3,932 miles nearer than when the Cape of Good Hope route is used. It gives New York an advantage of 2,424 miles over Liverpool when both ports use the Panama route—the shortest that is available to them when shipping to Sydney. This advantage holds good, in proportion, for the other eastern ports of Australia—Brisbane, Newcastle, Melbourne, Hobart, and Adelaide. For the western port of Freemantle, however, the advantage of shorter distance is with Liverpool by either the Suez or the Cape route.

Shipping conditions the world over have become so abnormal since the outbreak of the war that it would be useless, for the purpose of this report, to make an analysis of freight rates to Australia on the basis of the present rates. On the assumption that the cost of shipping has a natural tendency to equalize itself in normal times, it is expected that the rates from New York to eastern Australian ports will be slightly lower, on the whole, than those from Liverpool when the Panama route is followed in both cases.

Considering current developments in ocean shipping, it is hardly to be anticipated that, when the war is over, American implement manufacturers will be handicapped as regards their ability to place their goods advantageously in the hands of their Australian connections.

NOTE.—In connection with the foregoing report, Commercial Agent Homs submitted a list of Australian importers and dealers in agricultural implements and machinery. Interested persons may obtain this list from the Bureau of Foreign and Domestic Commerce or its district or cooperative offices by referring to file No. 1342.

Part 2.—NEW ZEALAND.

I. INTRODUCTION.

LOCATION, AREA, AND GOVERNMENT.

The Dominion of New Zealand is composed of three main islands (stretching for nearly 1,000 miles south of latitude 33° S.), which have a combined area of 103,658 miles, or 66,340,910 acres. These three islands are the North Island, with an area of 44,468 square miles; the South Island, with an area of 58,525 square miles; and the Stewart Island, with an area of 665 square miles. They have a combined coast line of 4,330 miles, no point in New Zealand being more than 75 miles from the sea. Including the several groups of outlying islands belonging to the Dominion, the total area of New Zealand is 104,751 square miles, or somewhat less than the combined areas of the States of Illinois and Iowa.

New Zealand, in the Southern Hemisphere, corresponds in latitude with several points in the United States. The extreme north of the Dominion is approximately in the same latitude as Fort Worth, Tex. Auckland is in the latitude of Portsmouth, Va.; Wellington in that of Bridgeport, Conn.; Christchurch in that of Portage, Wis.; Dunedin in that of Mackinac Island, Mich.; and Invercargill in that of Duluth, Minn.

New Zealand is a self-governing British Dominion. Its Government is as separate and distinct from that of Australia as that of the latter country is from Canada's. A governor (representing the King) and a council of ministers constitute the executive branch of the Government. The legislature is composed of a Legislative Council, the members of which are nominated by the Crown, and a House of Representatives, the members of which are elected by the adult population on a residential-qualification basis. The Maoris, the native race of New Zealand, have four representatives (1916) in the House of Representatives.

POPULATION.

The estimated population of New Zealand at the end of 1916 was 1,156,681, of whom 49,844 were Maoris. This gives a density of about 9.75 persons to the square mile. The North Island, with adjacent islets, has 56 per cent of the population and the South Island, including Stewart Island and adjacent islets, 44 per cent. According to the census of 1911, 97.92 per cent of the people are British born. Out of a foreign population of about 20,000, there are 4,000 Germans, 2,600 Chinese, 2,200 Danish, and 2,100 Austrians.

The four principal cities of the Dominion and their suburbs have a population of 317,835, or 31.52 per cent of the total. New Zealand has the lowest death rate of any country in the world, namely, 9.06 per thousand in 1915. This condition, as well as the remarkable physical development of the Maori or native race, is attributed to the salubrity of the climate. With its abundant natural resources New Zealand can easily support a population many times larger than it now has.

Up to the beginning of the war there was a continuous increase in the population. A natural increase has been maintained for several years at the rate of 18,000 per annum. The net increase of population by immigration in 1910, 1911, 1912, and 1913 was 3,408, 4,200, 8,927, and 14,219 respectively. Taking the expeditionary forces into account the immigration figures show a net loss of 6,858 and 11,085 in 1914 and 1915, respectively. While some elements in New Zealand are opposed to immigration, the Dominion has substantially encouraged immigration from Great Britain, chiefly of farmers, farm laborers, and domestic servants, by supplying passages at reduced rates. Since 1910 20,574 persons have availed themselves of this assistance.

Out of 454,117 breadwinners in the Dominion (census of 1911) 54,738 were engaged in agricultural and 55,287 in pastoral pursuits, or a proportion of 25 per cent for these two industries combined. Since the pastoral industry is New Zealand's chief source of wealth the majority of breadwinners are directly or indirectly engaged in or supported by it.

PRINCIPAL CITIES.

The chief cities of the Dominion, according to the 1916 census, and their population, including their suburbs, are as follows: Auckland, 134,099; Wellington, the capital, 95,208; Christchurch, 92,413; and Dunedin, 68,729. Other important centers are Gisborne, 12,664; Napier, 14,743; Wanganui, 19,546; and Palmerston North, 13,003, in the North Island; and Nelson, 9,890; Timaru, 13,939; and Invercargill, 17,870, in the South Island.

PHYSICAL FEATURES.

NORTH ISLAND.

The North Island has a distance from north to south of 498 miles. As a whole it is hilly and in parts mountainous in character, but there are large areas of plains and comparatively level country that are (or by clearing may be made) available for agriculture. Chief among these are the plains in Hawke's Bay on the east coast, the Wairarape Plain in the Wellington district, and a strip of country along the west coast, about 250 miles in length, from a point about 30 miles from Wellington to a little north of New Plymouth. The largest plain in the North Island extends from the shore of Lake Taupo in a northeasterly direction to the seacoast on the Bay of Plenty, but a great part of it is covered with pumice sand and is unfit for tillage or pasture. There are several smaller plains and numerous valleys suitable for agriculture. The level or undulating country in this island fit, or capable of being made fit, for agriculture has been roughly estimated at 13,000,000 acres. This includes the lands now covered with standing forests and swamps that can be drained, as well as large areas of clay marl and pumice covered land. The clay marl in its natural state is cold and uninviting to the farmer, but under proper drainage and cultivation it can be brought to a high state of productiveness. This kind of land is generally neglected at the present time, as settlers prefer soils more rapidly remunerative and less costly to work.

The larger portion of the North Island was originally covered with forests. Although the area of bush land is still very great, the amount is being reduced year by year, chiefly to meet the requirements of settlement, the trees being cut down and burned and grass seed sown on the ashes to create pasture. Hilly as the country is, yet from the nature of the climate it is especially suitable for the growth of English grasses, which will flourish wherever there is any soil, however steep the land may be. Once laid down in grass, very little of the land is too poor to supply food for cattle and sheep. The area of land in the North Island deemed purely pastoral or capable of being made so, while too steep for agricultural purposes, is estimated at 14,200,000.

The Maori King country, partly occupied by natives who for several years isolated themselves from Europeans, lies between Lake Taupo and the western coast.

The mountains in the North Island are estimated to occupy about one-tenth of the surface and do not exceed 4,000 feet in height, with the exception of a few volcanic mountains that are more lofty.

Cook Strait separates the North and South Islands. It is some 16 miles across at its narrowest part, but in the widest about 90. The strait is invaluable for purposes of traffic between different parts of the Dominion.

SOUTH ISLAND.

The extreme length of the South Island is about 525 miles. It is intersected along almost its entire length by a range of mountains known as the Southern Alps. Some of the summits reach a height of 10,000 to 12,000 feet, Mount Cook, the highest peak, rising to 12,349 feet. For beauty and grandeur of scenery the Southern Alps of New Zealand may worthily compare with, while in point of variety they are said actually to surpass, the Alps of Switzerland.

The general surface of the northern portion of the South Island, comprising the districts of Nelson and Marlborough, is mountainous, but the greater part is suitable for grazing purposes. There are some fine valleys and small plains suitable for agriculture, of which the Wairau Valley or plain is the largest. Deep sounds, extending for many miles, break the coast line abutting on Cook Strait. The city of Nelson is situated at the head of Blind Bay, which has a depth inward from Cook Strait of about 40 miles. The district of Canterbury lies to the south of the Marlborough district, and on the eastern side of the island. Toward the north the land is undulating; then there is a stretch of almost perfectly level country extending toward the southwest 160 miles, beyond which, on the south, the country is undulating as far as the borders of the Otago district. On the east a block of hilly country rises abruptly from the plain and extends for some miles seaward. This is Banks Peninsula, containing several good harbors, the principal one being Port Cooper, on the north, on which is situated Lyttelton, the chief port of the district; the harbor of Akaroa, one of the finest in the Dominion, is on the southern coast of this peninsula.

The district of Otago is, on the whole, mountainous, but has many fine plains and valleys suitable for tillage. The mountains, except toward the west coast, are generally destitute of timber and suitable for grazing sheep. The district of Westland, extending along the west coast of the South Island, abreast of Canterbury, is more or less auriferous throughout. The western slopes of the central range of mountains are clothed with forest to the snowline; but on the eastern side timber is scarce, natural grasses covering the ground.

The area of level or undulating land in the South Island available for agriculture is estimated at about 15,000,000 acres. About 13,000,000 are suitable for pastoral purposes only, or may become so when cleared of forest and sown with grass seed. The area of barren land and mountain tops is estimated at about 9,000,000 acres.

New Zealand, on the whole, possesses a remarkable network of rivers, which intersect the country in all directions. Many of these may eventually prove of great value in connection with irrigation, although the generous rainfall will frequently make this unnecessary.

CLIMATE AND RAINFALL.

The climate of New Zealand must be considered in connection with (a) its length, stretching as it does for nearly 1,000 miles, (b) its insular position, being situated in the greatest of the oceans, (c) its physical features, having mountain ranges running directly north and south, and (d) the weather changes to which the country is subject.

These conditions have combined to make the climate of New Zealand extremely equable and exceptionally salubrious, the fertility of the soil and the health of the inhabitants giving remarkable testimony to its geniality. Although labor is not plentiful enough to obtain the best results from agriculture, yet the average yields compare more than favorably with those of other countries. In few parts of the world, indeed, are climatic conditions more favorable to animal and vegetable life than in New Zealand. The Maori is one of the finest races in the world, and Europeans, under the skies of New Zealand, have generally developed into finer and stronger men and women than their parents. Imported seeds and stock thrive most marvelously. Stock, in both winter and summer, finds in most parts of the country enough nourishment in the fields, whereas it needs no protection other than the bush, which, where allowed to grow, thrives most luxuriantly. From youth to age men keep in vigorous health and enjoy life to the fullest extent.

The freedom of the country from intense heat in summer and cold in winter is a distinct advantage to its animal and vegetable life. The mean annual temperature in the North Island is 55.4° F., and that of the South Island 51.8°, while the absolute maximum and minimum temperature shows a mean daily range of 15.9° in the North and 16.5° in the South Island.

The temperatures of the four principal cities of the Dominion, which are situated at almost uniform intervals throughout the length of the country, are as follows:

Cities.	January (midsummer).				July (midwinter).			
	Mean maximum.	Mean minimum.	Absolute maximum.	Absolute minimum.	Mean maximum.	Mean minimum.	Absolute maximum.	Absolute minimum.
	°F.	°F.	°F.	°F.	°F.	°F.	°F.	°F.
Auckland	73.2	59.2	81.5	50.0	58.3	47.1	62.5	36.5
Wellington	69.0	57.1	84.0	47.6	55.1	44.6	59.8	33.2
Christchurch	70.7	52.1	87.8	41.6	54.6	36.0	66.1	25.9
Dunedin	65.9	49.3	83.0	40.0	51.9	39.2	61.0	31.0

Because of the marine climate the winds are stronger than in continental countries. Many parts of New Zealand, however, are so sheltered by mountain ranges that the wind records are very small indeed. In summer, however, to the north of Auckland, the easterly trade winds often blow with much regularity for several continuous weeks. The daily average wind velocity for a period of many years is as follows: Auckland, 180 miles; Wellington, 282 miles; Hokitika, 135 miles; and Lincoln, 164 miles.

Bright sunshine is abundant not only in summer but also in winter, when a large percentage is maintained. This is accounted for by the fact that rain and clouds are usually associated with the fall of night and early morning.

Snow falls in winter in the higher places of the South Island, and occasionally on the central plateau of the North Island, where, except on the mountain tops, it usually does not last long. In Auckland and Wellington frosts on the grass are rare occurrences, though farther south and inland they are often experienced.

New Zealand has an abundant rainfall which, though well distributed throughout the entire year, especially in the South Island, is heaviest and most prevalent in the winter and spring months. The annual averages, and the amount falling in each season of the year, are as follows:

	Winter.	Spring.	Summer.	Autumn.	Annual.
	Inches.	*Inches.*	*Inches.*	*Inches.*	*Inches.*
North Island	13.86	14.07	12.08	11.34	51.35
South Island	11.97	13.31	10.96	10.39	46.63

NOTE.—It must be remembered that winter in New Zealand includes the months of June, July, and August, while spring comes in September, October, and November, summer in December, January, and February, and autumn in March, April, and May.

In the North Island there is a most remarkable uniformity in the rainfall, only a very small portion of it having an average rainfall of less than 40 inches (which is seldom below 30 inches). In the South Island there is the contrast of a broad strip of country along the entire length of the west coast that has an average of more than 100 inches, while the east coast has an almost uniform rainfall of about 30 inches. In fairly large areas in the extreme southern and northern districts the rainfall increases to 40 inches. In a rather small area, about 25 miles east of Oamaru, it is less than 20 inches.

The rainfall varies considerably in different parts of the South Island. Points on the west coast show a maximum of 154.44 inches, whereas a minimum of 13.54 inches has been registered on the east coast. In both North and South Islands rain falls, on an average, 155 days per annum.

II. ECONOMIC CONDITIONS IN THE DOMINION.

STATISTICS OF PRODUCTION.

The value of the total production of New Zealand for the year 1910–11 was estimated as follows: Agricultural, $20,199,814; pastoral, $123,691,342; mineral, $18,370,541; manufacturing (value added in process of manufacture), $37,183,174; miscellaneous, including fisheries and forestry, $10,121,668; building trade, industries not included in manufactures, and general labor, $40,329,951; total, $249,896,490. The most noticeable increase, in a comparison of the figures with those of preceding years, occurs in connection with the pastoral industry.

No estimates of this character appear to have been made since 1910–11, but it can be safely said that the Dominion has notably and steadily increased the value of its production since that year. This fact is well reflected in the increased value of its principal exports, as shown by the following comparison, which represents an increase of approximately 72 per cent for the period reviewed:

Articles.	1910	1916
Wool	$40,432,877	$60,276,829
Frozen meat	18,739,806	35,385,869
Butter	8,817,976	12,810,053
Cheese	5,817,283	17,102,390
Phormium fiber	2,182,207	4,874,037
Total	75,990,149	130,449,178

Owing to the direct relation of the agricultural and pastoral industries to the farm-machinery trade, they are separately reviewed in subsequent sections.

MANUFACTURING INDUSTRIES.

The following figures show the progress of manufacturing in New Zealand between the years 1906 and 1911. They include establishments employing more than two persons, when the goods produced are for sale, and all classes of industries, from agricultural-implement factories to dyeing and cleaning works; in other words, some establishments that would hardly be considered manufacturing enterprises in the United States, such as meat-freezing works, dressmaking and millinery shops, etc.:

Items.	1906	1911
Number of establishments	4,186	4,402
Hands employed	56,359	56,234
Wages paid	$21,693,003	$27,117,452
Horsepower	60,335	100,587
Value of all manufactures or produce	$114,091,369	$154,409,188
Approximate value of land, buildings, and machines	$61,957,159	$81,423,159

MINING.

The mining resources of New Zealand are of considerable importance, and they have exerted much influence in the development and progress of the county. The mining production in 1915 and its total value since 1853 are as follows:

Articles.	1915	Total value since 1853.
Gold	$8,246,542	$411,941,745
Silver	465,155	10,202,043
Coal	6,190,417	110,031,891
Kauri gum	1,358,401	85,339,625
Other minerals	161,378	2,714,261
Total	16,421,893	620,229,565

Scheelite, copper, manganese ore, cinnabar, tin, sulphur, and phosphate rock are found in various parts of New Zealand, but the commercial mining of these minerals has not been actively undertaken so far.

IRON ORE AND SAND.

Almost every known variety of iron ore has been discovered in New Zealand. At Parapara, near Nelson, immense quantities of limonite ore occur in the surface of the ground. It is estimated that the main deposit contains nearly 64,000,000 tons of ore. Another deposit of this ore, about 60 feet thick, exists on the west side of Mount Peel. This ore contains 56 per cent of metallic iron, and it is said to have been traced a distance of 3 miles, beyond which it is reported to swell out to as much as a mile in width.

A company has recently been formed in New Zealand with a capital of $300,000 with the object of producing iron and steel from magnetic and titaniferous iron sand, of which there is a large deposit on the coast at Taranaki, near New Plymouth, where the works are to be erected. The initial plant will be capable of dealing with 75 tons of iron sand weekly, but plans have been drawn up for the installation at a later date of an additional furnace capable of handling 200 tons weekly. The production of steel is also contemplated, and it is intended to form a company later to carry out this development.

By the provisions of the iron and steel industries act, 1914, bounties will be paid at the rate of 12s. ($2.92) per ton on pig iron and 1s. 4d. ($0.32) per ton on puddled bar iron and steel to cover a period of three years, with a proviso that the total sum payable as bounty shall not exceed $750,000.

KAURI GUM.

Next to gold and coal, kauri gum has contributed more to the revenue of New Zealand than any other mineral. This is the solidified turpentine of the kauri pine and is found in considerable quantities in the Auckland district. Usually this gum is dug from the ground, but it is also often obtained from the forks of living trees. In the fossil state kauri gum occurs in lumps varying in size from a walnut to a man's head. Most of this gum or resin is used in the manufacture of oil varnishes of high quality. The United States has been one of the largest purchasers of this New Zealand product.

FORESTS AND WATER POWER.

New Zealand's Crown forests cover an area of about 7,900,000 acres, which are said to contain 19,000 million superficial feet of timber, most of it of excellent quality.

The Dominion has also a practically unlimited supply of water power, a considerable amount of which is suitable for general industrial development. This constitutes one of its most valuable reserve assets, for the water force readily available for generating electricity is estimated at about 4,000,000 horsepower, in addition to the power that can be derived from rivers less accessible at present from the main centers of population. It is not improbable that with a substantial increase in its population the Dominion will eventually develop manufacturing undertakings of considerable magnitude and value.

FOREIGN TRADE.

The following table shows New Zealand's exports, imports, excess of exports over imports, and excess of exports over imports per capita of mean population (excluding Maoris) for the six years 1911 to 1916; specie is excluded from these figures:

Years.	Exports.	Imports.	Excess of exports over imports.	Excess of exports per capita.
1911	$92,367,070	$91,405,562	$961,508	$0.93
1912	104,686,328	100,135,922	4,550,406	4.38
1913	111,006,632	105,377,400	5,629,232	5.27
1914	127,764,726	102,898,381	24,866,345	22.81
1915	152,958,095	100,535,661	52,422,434	47.67
1916	161,962,264	121,883,454	40,078,810	36.46

For the purpose of comparison it may be stated that the excess of exports over imports in the foreign trade of the United States during the calendar year 1916 amounted, on the basis of 100,000,000 people, to about $30.90 per capita.

The value of the principal exports from New Zealand during 1916 was as follows: Wool, $60,276,829; frozen meat, $35,385,869; cheese, $17,102,389; butter, $12,810,054; gold, $5,835,965; *Phormium tenax* fiber, $4,874,895; sheepskins (with and without wool), $4,465,661; tallow, $3,821,853; hides, $2,947,483; lumber, $1,856,458; kauri gum, $1,651,413; coal, $1,589,170; potted and preserved meat, $1,214,284.

The following table shows the imports and exports (including specie) by countries of origin and destination; it is apparent from these figures that the United States has increased to a very substantial extent its purchases of New Zealand products and its sales to the Dominion:

Countries of origin and destination.	1911	1912	1913	1914	1915	1916
IMPORTS FROM—						
United Kingdom	$57,362,895	$60,830,213	$64,783,787	$58,329,606	$54,218,002	$67,495,703
Canada	1,379,215	1,918,613	2,202,184	2,331,735	3,882,571	3,685,333
Australia	14,331,799	12,574,486	14,185,108	3,376,371	3,554,535	19,476,565
Belgium	629,336	748,302	990,459	537,218	17,281	21,072
France	667,475	730,092	733,756	718,670	643,356	551,628
Germany	2,338,923	3,178,934	3,347,836	1,997,572	53,489	20,863
Japan	599,786	752,298	735,357	912,473	1,480,983	2,739,712
United States	8,186,081	9,974,466	10,258,533	11,110,054	12,654,107	19,319,639
All other countries	9,624,510	11,375,093	11,229,022	27,048,992	29,239,047	14,869,606
Total	95,120,020	102,082,497	108,466,042	106,362,691	105,743,371	128,180,121
EXPORTS TO—						
United Kingdom	73,653,227	82,055,302	88,230,424	104,064,705	123,555,713	130,762,797
Canada	971,290	2,638,962	2,952,321	2,898,541	4,505,518	3,367,550
Australia	12,240,065	13,863,023	11,269,583	9,384,607	12,402,786	10,665,066
Belgium	150,258	117,857	90,137	7,592	5	10
France	195,653	459,310	867,872	1,104,827	10,511	1,485,952
Germany	829,704	1,239,512	1,642,191	2,219,917	15	24
Japan	1,835	7,105	14,118	289,596	668,968	535,533
United States	2,114,913	3,022,038	4,438,496	5,003,025	9,764,666	12,136,988
All other countries	2,445,202	2,543,423	2,359,741	2,828,522	3,597,898	3,036,959
Total	92,602,147	105,946,532	111,864,883	127,801,332	154,506,080	161,990,879

In order to appreciate the relative commercial importance of New Zealand's principal ports, it may be well to note that the average annual value of imports, by ports, during the years 1911 to 1916, inclusive, has been as follows: Wellington, $32,373,433; Auckland, $31,685,889; Lyttelton (for Christchurch), $16,295,431; Dunedin, $13,417,359; Invercargill, $2,782,353; Napier, $2,696,153.

ECONOMIC EFFECT OF THE WAR.

The abnormal economic situations created by the war have caused an appreciation in the values of the Dominion's staple products that has markedly influenced the trend of the rural industries in several directions. The great inflow of funds in exchange for New Zealand's exports has brought abundant prosperity to the farming industry as a whole. Never before has the value of its agricultural output reached such a high ratio to the total population as since the war started.

On various occasions there has developed a serious shortage of refrigerating shipping to cope with the needs of the meat and dairy industries, but on the whole not only has the value of such exports increased but the quantity shipped has also been greater. New Zealand so far has fared at least as well as other countries depending on insulated tonnage.

The trade prospects at the time the writer visited New Zealand were very favorable indeed. The demand for the staple products produced there is very great, and the prices paid for them have been and continue to be very high.

III. GENERAL REVIEW OF NEW ZEALAND AGRICULTURE.

OUTLINE OF DEVELOPMENT.

The various phases through which agriculture in New Zealand has passed may be briefly summarized as follows: (1) Pastoral occupation, hardly to be considered as agriculture in the strict sense; (2) the growing of cereals in selected areas; (3) the advent of refrigeration, promoting a combination of crop raising (mostly grasses) and live-stock farming; (4) subdivision of farms, necessitating the growing of supplementary forage crops to increase the stock-fattening capacity of the farms or to make milk production profitable; lastly, (5) the growing of corn and alfalfa in summer and autumn, and of root crops in winter and early spring, as also the making of hay and ensilage for winter feed.

This last phase of the Dominion's agriculture has so far attained only small proportions, for the actual necessity of growing crops for cattle has not yet become apparent to the majority of farmers. They find that, as a rule, the mild winters enable their stock to find ample nourishment in the fields the year round. By far the largest part of the country is in permanent grasses that seldom or never come under the plow.

It must be remarked at the outset that no effort has so far been made by New Zealand farmers to become agriculturists in the sense of growing crops for the over-sea trade. Indeed, efforts are continually necessary to induce them even to grow enough cereals for the requirements of the country. The one aim and business of the farmers is to raise sheep and wool, lamb and mutton, and cattle for beef, butter, and cheese. Whatever crops have been grown by them hitherto have been due solely to the exigencies of insuring the success of their pastoral pursuits.

Whenever the growing of crops has been undertaken in New Zealand it has been proved that there are few other countries in the world where this can be done with so much certainty and with such good results. The country is admirably adapted for agriculture. Its extensive range of latitude insures a diversity of climate suitable for all the crops grown in the subtropical and temperate zones. Its insular position and its more than adequate rainfall constitute a protection from continuous and parching droughts. Its excellent climate, its healthfulness, and the extreme richness of most of its soils are other advantages.

The New Zealand farmer is a good judge of values and combines with his operations more than ordinary business sense. He has found that he can turn out wool, meat, and dairy products more profitably than general crops. Adding to this the fact that land is still rather plentiful, one readily sees why he has so far regarded as unnecessary the adoption of intensive farming methods. Other causes contribute to this attitude. One of the most important is the difficulty of obtaining labor and its high cost when procurable—a factor that in itself will doubtless prove a difficult problem to solve whenever there arises the actual need of growing cultivated crops upon an extensive scale. With their characteristic sagacity, however, the farmers of the Dominion are realizing this, and in order to meet the condition successfully they are modifying their methods of farming and raising such crops as will yield large quantities of stock feed with the least possible employment of labor. This explains why such root crops as turnips and others are so much in favor among them whenever it becomes necessary to supplement the natural and artificial pastures in connection with sheep and cattle raising.

The introduction of refrigeration in the meat and dairying industries in 1882 changed and considerably improved the commercial prospects and activities of the Dominion. During the prerefrigerator period sheep were killed to meet the local demand for meat, and what remained was boiled down for tallow. The average gross return per acre, at the rate of two sheep per acre, was then about $2.50, whereas for several years past the return per sheep, for wool and meat, has probably never averaged less than $6.50. The greater values thus obtained have enormously stimulated the adoption of intensive methods of sheep raising, to the point that in many holdings the carrying capacity of the land has increased four and five fold and in some cases considerably more.

The question of providing food to supplement grazing in winter is receiving increased attention in many parts of New Zealand. This is evidenced by the fact that during the past five years the area in root and green crops has been increased more than 50 per cent. In the past certain districts have incurred considerable losses occasionally through neglect of this provision. Progress in this direction will, of course, bring about a more extended use of farm machinery.

FARMING IN THE NORTH ISLAND.

All the forage plants thrive in the North Island and continue their growth throughout the year with little interruption. Stock of every kind fattens rapidly in the pastures, comes to maturity at an early age without the aid of root or other artificial feeding, and can pass the winter in the open.

Most of the country along the southwest coast is now taken up and the forests are fast disappearing before the settler's ax. For the most part the soil is fertile and the growth of grass and clover extremely rapid and vigorous when sown on the surface after the felled timber has been destroyed by fire. The best pasture grasses grow with no other preparation than the ashes resulting from the burned timber, without any plowing or loosening of the soil, yet within a year from the time of sowing such land will fatten from five to six sheep per acre.

The west coast of the North Island is essentially a cattle country. The midland areas, along the east coast, are adapted to long-wool sheep. There are millions of acres still unoccupied that are well suited for dairy stock and long-wool and crossbred sheep.

FARMING IN THE SOUTH ISLAND.

The South Island has magnificent plain lands and rolling downs, as well as vast mountain ranges. The central portion is a vast plain offering little or no obstruction to the plow. As one travels south the country assumes a different aspect, having gently undulating downs, well watered; the greater part of this region is well adapted for agriculture and nearly all of it is suitable for pastoral purposes.

The climate of the South Island is not so warm in summer nor so mild in winter as that of the North Island. Certain aspects of its climate and the lighter rainfall in some of the most highly developed districts have induced the farmers to grow larger areas of green and root crops, to supplement the pastures in winter and early spring, than is the case in the North Island. On the other hand, the favorable conditions for the growing of cereals have made the South Island the granary of the Dominion. In the South Island the raising of sheep is done more with a view to meat production than is the case in the North Island, where wool is, perhaps, the chief aim of the farmers.

NEW ZEALAND LAND DISTRICTS.

The Dominion is subdivided into 10 land districts. Each one of them presents different distinctive characteristics in connection with the pastoral and agricultural industries; hence a brief description of them is deemed necessary.

AUCKLAND.

This district forms the northern half of the North Island, and it covers an area of 13,525,540 acres. Most of it is flat and undulating, having comparatively little mountainous country. It has an abundant rainfall and is entirely free from droughts. The average rainfall is 39 inches and the mean shade temperature in summer 70°.

Auckland district has a great diversity of soils. In the north clay predominates, with large volcanic areas intervening. The south has a great deal of limestone country. In the southeast there are large areas of light pumice land. Throughout the district there are rich alluvial reclaimed-swamp areas, whereas much of the soil, on the whole, may be described as light and sandy.

Dairying is the staple farming industry, there being numerous creameries and cheese factories, while home separation is largely practiced. Stock raising and sheep farming are also carried on to a considerable extent. Auckland has more cattle than any other district, one-half being fine dairying stock. It produces more butter than the rest of the Dominion combined.

The raising of crops is not extensively practiced, but large quantities of corn, potatoes, and fruit are grown. It leads all other districts in the acreage in corn. The exportation of fresh and preserved fruit promises to become an important industry. The area in green and root crops compares well with that of the leading districts. *Phormium tenax* is raised to a considerable extent in the swamp lands, the output of the fiber being second only to that of the Wellington district.

The Auckland district is noted for its kauri gum, it being the only district where this is produced. It has more than 3,000,000 acres of virgin forests containing timber of fine quality, including vast areas of kauri trees. Its saw-milling operations are very extensive. The famous Waihi gold mine and other important gold mines are in this district, producing the bulk of the gold mined in New Zealand.

Auckland, the largest city of the Dominion, has the finest developed harbor in the country and is equipped with first-class shipping facilities. In industries, with the exception of woolen mills and agricultural-implement factories, it is considered the most important center of the Dominion. Hamilton, Tauranga, and Rotorua are large towns in the district.

HAWKE'S BAY.

This land district is situated on the east coast of the North Island. It has a coast line 300 miles long, and it covers an area of 5,508,900 acres. It is well watered by numerous rivers and streams. A good deal of its land is broken forest country.

It has a mild climate but along the coast is rather hot. The rainfall is lighter in some places than the averages for other sections of the Dominion, although there are probably no points with less than 30 inches of rainfall.

Hawke's Bay is preeminently a sheep-grazing district, with more than one-half of its area improved with English grasses. It leads in the number of sheep, having more than one-fourth the total number in the Dominion. Its meat-freezing establishments are of considerable importance. It has a large number of cattle, most of which are beef stock. Dairying has not received great attention in the past, but that industry lately has made good progress.

This is the second corn-growing district of New Zealand. Its other agricultural industries are not important. The land is excellent for the growing of grain and root crops, but the profits made in sheep raising have thus far deterred the farmers from cultivating large areas of land. Potatoes yield from 6 to 15 tons, and in some instances exceed that amount; this gives an idea of the capabilities of the soil. The district is well adapted to grape growing and the fruit industry is attaining some importance.

Napier, Gisborne, and Hastings are the principal towns of this district.

TARANAKI.

Taranaki is situated on the western side of the North Island and is reputed to be the most fertile district of the Dominion, with more land suitable for settlement, in proportion to its area (2,415,299 acres), than any of the other districts. It has numerous rivers which, in all directions, radiate toward the sea, and extensive areas of volcanic and alluvial soils. The climate is very healthful and the rainfall, in most places, averages 55 inches.

This is essentially a grazing and dairying district. It produces nearly one-half of all the cheese and is the second largest butter-producing district of the Dominion. It is third in point of cattle, 90 per cent being fine dairying stock. Sheep raising is not important at present, but the industry has lately made rapid strides.

The agricultural industry is of secondary importance, the only activity in that direction being the cultivation of root crops. Mining is unimportant; a number of bores, however, are yielding small quantities of petroleum. This district has made great progress in recent years. New Plymouth and Hawera are its chief towns.

WELLINGTON.

This district occupies the southern part of the North Island. It has an area of 7,051,000 acres. It is divided into two well-defined parts by the mountains forming the backbone of the North Island. Along the west coast there is a good strip of level and undulating country that is considered one of the finest parts of New Zealand and is celebrated for its stock-raising capabilities. Along the east coast the country is often rather broken, but it has many areas well adapted for pastoral and agricultural pursuits. Wellington has a greater quantity of good land than any other New Zealand district, and, except the mountain tops, all of it is fitted for use. At present a considerable part of it is forest clad. As it is cleared, following New Zealand practices, it is used for grazing.

The climate is mild and healthful. The mean annual temperature is 55°. The rainfall varies with the localities. Along most of the coast it is rather light, according to New Zealand standards, being from 30 to 40 inches. For a good stretch of country around the city of Wellington it is much heavier. Frosts are sometimes rather heavy in the interior.

The pastoral industry is very important and prosperous. The total area in grass is more than 3,000,000 acres, compared with 55,000 in cereals and 105,000 in root and green crops. Both soil and climate are extremely well adapted for the production of wool, butter, cheese, and frozen meat. It is the second largest district in point of sheep and third in cattle, 40 per cent being dairy stock. It is also the chief *Phormium tenax* growing district of New Zealand, producing nearly as much fiber as the remainder of the country.

Wellington, the capital of New Zealand, is the chief city. Its excellent harbor handles a very large proportion of New Zealand's trade. Palmerston North is another large town and important center of trade. Masterton, Greytown, Carterton, Fielding, and Wanganui are other large towns.

MARLBOROUGH.

This land district is situated in the northeast corner of the South Island, and it has an area of 2,768,000 acres. It is rather mountainous in character but not too rough for pastoral purposes. The sheep and timber industries are its chief developed assets.

The rainfall at Cape Campbell is only about 25 inches, but the amount increases to 65 inches toward the interior. Winter and spring are the wettest seasons; hence the country is not so well adapted for summer crops.

More than one-half of its area is utilized for merino-sheep raising on natural pastures. On sown grass the land keeps from two to four crossbred sheep per acre. The frozen meat of this district is unexcelled anywhere in the Dominion. Cattle raising is an increasingly important pursuit.

Agricultural development at present centers around Blenheim and Kaikoura, where the soil is extremely fertile and produces heavy yields of oats, peas, potatoes, and other crops. Conditions are most favorable for fruit growing, especially apples. This district has 42,000 acres in cereals, 2,782 acres in peas and beans, and more than 14,000 acres in green and root crops.

Blenheim is the chief town of this district.

NELSON.

Nelson has an area of 4,715,000 acres and is situated in the northwest corner of the South Island. It consists of masses of mountain ranges intersected by excellent small plains and valleys that are gradually being occupied for pastoral purposes. The climate is excellent and the rainfall nearly 60 inches. At present this is entirely a forest country; about two-thirds is still undeveloped Crown land, and only 150,000 acres are deemed suitable for mixed farming.

Cattle and sheep raising are the chief industries. There are about 18,000 acres in cereals and 12,000 acres in green and root crops. Fruit growing has made rapid strides in recent years and, with an area of 8,000 acres in orchards, this district leads the Dominion. Nelson, Westport, and Reefton are its principal towns.

WESTLAND.

This district occupies the central portion of the west coast of the South Island. Its length is 250 miles and the average width 27 miles. Its area is 3,894,887 acres.

It consists for the most part of the western side of the mountains known as the Southern Alps. Otherwise it is hilly and undulating, the flat land being limited to the river valleys and open swamps. Its heavy rainfall of 117 inches falls in 200 days in the year—mostly, however, during the night.

On account of the moist climate it is very difficult to save grain crops and hay, hence little agriculture is carried on. In this respect, Westland is the most backward district of New Zealand. Some parts of the country are well adapted for dairying purposes. Its land produces rich grasses and root crops in abundance. The timber industry is at present its most important asset; 50,000,000 feet of timber are shipped from this district every year.

Greymouth and Hokitika are the two largest towns.

CANTERBURY.

This land district occupies the eastern central portion of the South Island, and it has an area of 9,533,045 acres.

Along the coast the climate resembles that of New England, although it is more equable. The extremes of temperature are 98.4° and 19.9°. The Southern Alps, forming its western boundary, extend the whole length of the district, the width of these mountains varying from 35 to 55 miles. The climate there is very variable, snow being of frequent occurence during the winter and permanent above 6,000 feet. The average rainfall is 27 inches over a somewhat wide stretch of land along the coast and increases to 35 inches at the foot of the mountains.

Parallel with the coast there are arable plains and downs containing more than 2,400,000 acres, which have rich soil for high-class cultivation, the profitable production of cereals, dairy farming, and fattening stock. The soil is richest along the coast; farther inland it is lighter and more subject to drought. Near the foot of the mountains the soil is again excellent and well watered. The mountain country has more than 5,000,000 acres utilized almost exclusively for sheep raising. There are other extensive pastoral and agricultural areas in this district, the Banks Peninsula, in particular, being well developed along these lines.

This district has nearly as much land in cereals as the remainder of the Dominion, and it also has the largest area in root and green crops. In many other ways it is the leading agricultural district of New Zealand, although the crops raised, aside from cereals, are chiefly intended to increase the stock-carrying capacity of the land.

In recent years an extensive water-race system has been constructed to supply water to the drier areas, making possible smaller holdings than would be the case otherwise. In 1911 there were 4,940 miles of these races, watering an area of 1,165,472 acres and constructed at a cost of about $1,000,000.

This district has an excellent reputation for the splendid quality of its sheep. On the mountains and hills merino sheep predominate, but on the richer lowlands the prevailing types are crosses between the merino and the Leicester, Lincoln, Romney Marsh, and similar breeds. Flocks and herds are supported by the natural and artificial pastures without shelter. The development of the frozen-meat trade has given a great impetus to sheep breeding, and the finest meat exported by New Zealand is supplied by this and the Marlborough district. Numerous freezing works are established throughout this district.

The dairying industry is not relatively as important in the Canterbury district as in some other parts of New Zealand. Banks Peninsula, however, is excellently situated for dairy farming, and throughout this district a great increase in production has taken place in recent years. Three-fifths of its cattle consists of fine dairying stock.

Next to Auckland the Canterbury district—and chiefly Christchurch, its capital—is the most important in the Dominion as regards manufacturing industries. In the construction of farm machinery it holds first place, having 7 large factories, out of a total of 19 for the Dominion.

Christchurch is situated on the plains and is connected with the port of Lyttelton, 7 miles distant. Lyttelton, Timaru, Rangiora, Ashburton, and Waimate are among the other important towns of this district.

OTAGO.

This district is situated between the Canterbury and the Southland districts, occupying an area of 9,049,000 acres. The interior is rather elevated and in parts mountainous. The rainfall there is light, and the extremes between summer and winter temperatures show perhaps a greater range than anywhere else in New Zealand. Near the coast the climate is salubrious and more equable. The rainfall on the east coast averages 38 inches and on the west coast more than 100 inches.

The most productive lands lie in a belt along the east coast. The soil in the north of this belt is black loam. Farther south there is much deep soil varying from heavy loam on clay subsoil to alluvial deposits. Heavy yields are given by cereal and root crops. Agriculture and dairying are very important industries there. Otago is surpassed only by Canterbury in the production of wheat, oats, and turnips and by Taranaki in cheese. Sheep raising is its principal source of wealth, this being the second district of the Dominion in number of sheep. The chief pastoral areas are situated in the interior. Gold and timber also form important industries. Dunedin is a large manufacturing center and the capital of the district. It is served by Port Chalmers, 8 miles distant, but the deepening of the Otago Harbor now permits the berthing of ocean liners alongside the Dunedin wharves. Oamaru is another important town in this district.

SOUTHLAND.

This district is situated in the southern and southwestern part of the South Island, and it has an area of 7,583,892 acres, of which 2,400,000 are covered with brush and a considerable area is wild alpine country.

The climate is bracing in winter and genial in spring and summer. Along the southern coast the rainfall is about 30 inches, but toward and along the west coast it is very much heavier—about 100 inches, in fact. Along the central northern part the rainfall is somewhat less. The entire rainfall is better distributed throughout the year than in other parts of the Dominion.

The plains and lower hills of the Southland district are excellently adapted for the growing of cereals and all crops common to the temperate zone. Agriculture, however, is not receiving as much attention from its farmers as pastoral pursuits, in spite of the fact that wheat yields from 40 to 60 bushels and oats frequently give 70 to 80 bushels. Potato growing, however, is an important industry. Owing to the excessive moisture and the swampy nature of the land, certain areas are being brought into a high state of cultivation by means of drain plows. The stock raised in this district holds a very high place, not only throughout the Dominion, but also in Australia. Southland's horses, cattle, and sheep for stud and other purposes are in great demand. Its frozen meat enjoys an enviable reputation, and this industry is making very rapid strides. The present progress of the agricultural and pastoral industries is of a very marked and substantial character.

The most important industries are those connected with the raising of sheep for mutton and wool, but dairying is growing also to be a large industry, especially for the manufacture of cheese.

Invercargill, Gore, Bluff, and Campbelltown are the most important towns of this district.

AREA UNDER CULTIVATION.

The following table shows the acreage under various crops in New Zealand, by land districts, during the season 1915–16:

GRAIN AND PULSE CROPS.

Districts.	Wheat.	Oats.	Barley.	Corn.	Peas and beans.	Other crops.	Total.
	Acres.	*Acres.*	*Acres.*	*Acres.*	*Acres.*	*Acres.*	*Acres.*
Auckland	3,303	47,521	1,250	4,814	205	94	57,187
Hawkes Bay	2,142	26,951	6,323	3,791	85	53	39,345
Taranaki	1,465	10,424	1,031	32	51	5	13,008
Wellington	12,443	40,206	1,668	84	646	180	55,227
Total North Island	19,353	125,102	10,272	8,721	987	332	164,767
Nelson	2,275	13,389	1,709	18	271	785	18,447
Marlborough	6,029	24,712	8,613	25	2,782	158	42,319
Westland	14	652	....	5	....	....	671
Canterbury	248,858	240,535	7,197	28	4,977	1,105	502,700
Otago	50,383	118,229	4,275	....	337	224	173,448
Southland	9,034	122,542	431	....	5	11	132,023
Total South Island	316,593	520,059	22,225	76	8,372	2,283	869,608
Grand total	335,946	645,161	32,497	8,797	9,359	2,615	1,034,375

GREEN AND ROOT CROPS.

Districts.	Grasses and clovers.		Potatoes.	Turnips.	Mangolds.	Onions.	Green fodder.	Other crops.	Total.
	Cut for seed.	Cut for hay and ensilage.							
	Acres.	*Acres.*	*Acres.*	*Acres.*	*Acres.*	*Acres.*	*Acres.*	*Acres.*	*Acres.*
Auckland	9,278	33,455	5,136	83,981	991	131	18,084	502	151,558
Hawkes Bay	14,117	9,909	1,263	23,112	620	28	24,075	579	73,703
Taranaki	491	19,404	619	41,998	1,393	7	5,646	478	70,036
Wellington	5,977	15,644	3,196	50,233	1,321	49	28,200	78	104,698
Total North Island	29,863	78,412	10,214	199,324	4,325	215	76,005	1,637	399,995
Nelson	784	3,233	693	5,131	48	4	2,272	278	12,443
Marlborough	1,175	3,034	525	3,930	382	8	5,246	11	14,311
Westland	120	473	53	2,083	....	....	272	2	3,003
Canterbury	21,121	4,871	13,074	146,433	5,246	448	102,893	577	294,663
Otago	6,299	5,018	4,021	114,000	1,594	17	28,102	73	159,124
Southland	22,084	769	2,306	102,758	1,577	....	17,372	1	146,867
Total South Island	51,583	17,398	20,672	374,335	8,847	477	156,157	942	630,411
Grand total	81,446	95,810	30,886	573,659	13,172	692	232,162	2,579	1,030,406

The following table shows the total area of land in cultivation, under some crop or other, in New Zealand, during the season 1915–16. The figures in the preceding tables are included:

	Total area in grain and pulse crops.	Total area in green and root crops.	Fallow land.	Vineyards and orchards.	Market, seed, and private gardens.	Sown grass (not cut for hay).	Plantations.	Total area cultivated.
	Acres.	*Acres.*	*Acres.*	*Acres.*	*Acres.*	*Acres.*	*Acres.*	*Acres.*
North Island	164,767	399,995	41,531	16,456	33,702	10,056,907	66,613	10,779,971
South Island	869,608	630,411	43,134	18,408	31,862	4,566,751	44,029	6,204,203
Total	1,034,375	1,030,406	84,665	34,864	65,564	14,623,658	110,642	16,984,174

In addition to the area cultivated during the season 1915–16, the following areas were under occupation: *Phormium tenax*, 55,405 acres; tussock and other grasses, 16,704,068 acres; standing virgin bush, 4,605,944 acres; and barren and unproductive land, 3,037,449 acres—making the total area under occupation 41,386,040 acres. Since 1910–11 the area under occupation has been increased by 1,147,914 acres, of which 18,553 acres are under grain and 316,724 under green and root crops. This shows that the progress made by agriculture proper is chiefly in connection with the crops raised to supplement the stock pasturage.

SIZE, NUMBER, AND ACREAGE OF HOLDINGS.

The number of holdings, their size, and the total acreage of occupied lands both agricultural and pastoral, in New Zealand in 1916 was as follows:

Size of holdings.	Number of holdings.	Total acreage.
1 to 10 acres	15,454	69,390
11 to 50 acres	12,748	358,726
51 to 100 acres	9,122	708,228
101 to 200 acres	12,159	1,812,196
201 to 320 acres	7,972	2,054,917
321 to 640 acres	9,572	4,355,985
641 to 1,000 acres	3,895	3,149,598
1,001 to 5,000 acres	5,284	10,366,504
5,001 to 10,000 acres	517	3,593,266
10,001 to 20,000 acres	277	3,880,927
20,001 to 50,000 acres	165	5,126,470
Over 50,000 acres	64	5,785,986
Total	77,229	41,262,193

NOTE.—Holdings have increased by 4,891 and the acreage by 3,853,720 since 1906–7.

Of the total number of settlements 57,455, or 74.40 per cent, were from 1 to 320 acres, and 19,774, or 25.60 per cent, more than 320 acres in size. This indicates a considerable degree of moderately close settlement, considering that holdings devoted to sheep raising are included in these figures. Of a total of 77,229 holdings, 46,922 are owned by freeholders, these having an aggregate area of 17,299,611 acres; 2,209,901 acres are leased from private individuals; 1,373,476 acres are leased from public bodies; 2,020,410 acres are leased from Maoris; 11,861,277 acres are Crown lands held under pastoral lease; 6,523,927 acres are Crown lands held under other tenures; and 97,438 acres are under tenure not specified.

LAND SETTLEMENT.

When the Dominion was first settled a large proportion of the land was not occupied by the Maori inhabitants. The rather small number of early colonists, consequently, had full opportunity to select land in large areas. As the finances of the country were at that time dependent, to a large extent, upon the sales of land, it naturally followed that the Government was anxious to settle its vacant lands as soon as possible so as to render them productive and bring about an increase in the population. The original farms, therefore, were of very large size.

In recent years the gradual rise in population and the decrease of the vacant areas caused the Government to enact legislation tending to the subdivision of the land. Many farms have thus been subdivided into smaller farms. This has brought about more careful occupation and intensive development, with better yields of crops and cattle, and has permitted a larger population to be supported. Moreover, lands that had been thought to be more or less unsuitable for settlement in any but extensive areas have been found capable of utilization in moderately sized pastoral runs, while the growth of the dairy industry has enabled the most valuable lands to be occupied by families in areas much smaller than had previously been the rule.

Under certain laws the Crown is empowered to purchase estates suitable for subdivision and closer settlement. A large proportion of such purchases are by mutual agreement, but the law contains provisions for the compulsory acquisition of estates. The price is determined upon by the owner being paid the unimproved value of the land as given in the Government valuation roll, upon which the owner has been paying rates, plus from 5 to 10 per cent of the value so stated together with the value of improvements standing on the land. To the total amount another 10 per cent is added by way of compensation for the compulsory taking. Up to March 31, 1916, 282 estates had been thus acquired and no fewer than 5,477 separate farms are now occupied thereon. The cost of acquiring this land was somewhat in excess of $35,000,000, and it involved 1,540,578 acres. The productiveness of the land settled in this manner has been largely augmented and the rural population has continually been added to.

To promote further the closer settlement of the land, laws have been passed enabling groups of private persons to purchase blocks of freehold land and subdivide and occupy it in separate holdings. The purchase price is guaranteed by the Government, and the members of each group pay only a small deposit when taking up the land, giving a mortgage over their respective holdings. The purchase money is paid within a period of 20 years. Such holdings can not ordinarily be less than 25 acres nor more than 200 acres (which can, however, be increased under certain circumstances). Forty-four of these blocks have been bought since 1910, containing a total area of 42,511 acres, which is now occupied by 303 separate holdings, purchased at a price of about $2,900,000.

SOILS.

New Zealand is a country of extremely varied soil conditions. There are extensive areas of rich alluvial soils, while sandy loam, clay, sandy clay, and clay loam soils are also very general. New Zealand soils are usually well supplied with acidity, and when first taken up they are for this reason in a rather unsatisfactory physical condition. Almost without exception the application of lime is beneficial, while the use of superphosphates also improves them.

In some places there are extensive areas of land strewn with bowlders having a considerable depth of black soil beneath. Swamp plows, referred to later, are largely used to make them cultivable.

FERTILIZERS.

While New Zealand soils are generally well supplied with nitrogenous matter they need phosphatic manures to give good yields whenever the land has been submitted to exhaustive cropping. These have also proved beneficial to promote rapid root growth, to improve the tilling condition, to hasten maturity, and to enable the soils to better withstand a scarcity of rainfall. Of 130,000 tons of manure imported into the Dominion, about one-half consists of superphosphates. Basic slag is also frequently applied to the land and bone dust is nearly always mixed with superphosphates to improve the flow of the manure when applied by means of grain drills. These manures are generally used in a moderate way in connection with the sowing of cereals and root crops. The Government carries all fertilizers and lime for a distance of 100 miles on its railways without cost to the farmer.

Farmyard manure is not used to any extent in strictly agricultural operations, for the reason that only a small quantity of this is produced. The vegetable gardens, which nearly always form an adjunct to the New Zealand farm, consume what little of this is available.

IRRIGATION.

The abundant rainfall normally prevailing throughout the Dominion and the restricted activities in agriculture proper have so far made it unnecessary for the farmers and the Government to give much attention to irrigation matters. Only in the central parts of the Otago district has some work been done along irrigation lines. This it is intended to extend in the future so as to irrigate 90,000 acres of land.

In connection with rainfall and irrigation it should be said that occasionally there is deficiency of rain along the east coast of the South Island, where the bulk of cereals and other cultivated crops are grown. Though such conditions are never severe, the yield of 21.60 bushels of wheat in 1915 against an average yield of 30 bushels for the four preceding seasons is a matter of concern to the New Zealand grower. The extent of this can be better appreciated from the statement that, with an increase of 100,000 acres in 1915, the total wheat crop was nearly the same as that of the preceding year.

There is no question that in certain parts of New Zealand irrigation will eventually play an important rôle. Whenever the necessity arises New Zealand will find an immense source of wealth in the numerous rivers that traverse the country in all directions, the waters of which can be made available for irrigation very readily and at a small expense.

GOVERNMENT ENCOURAGEMENT AND ASSISTANCE.

Since New Zealand is essentially an agricultural country it is obvious that the chief aim of the Government is to promote the development of the land industries by all means available. Much of the present satisfactory position of these is due to the Government's helpful and stimulating agrarian policy. By means of a large and efficient staff of experts it directs, supervises, and aids the activities of the farming community. Work of a most practical character is conducted on the experimental farms, where, besides the customary activities, arrangements have been made to give a certain amount of practical education to farmers' sons.

Boys' training farms are maintained at Weraroa and Nelson, where the number of students in 1915 was 491 and 222, respectively.

The Canterbury Agricultural College is a most complete and progressive institution where an opportunity is afforded to acquire a thorough knowledge of the science and practice of agriculture. In the technical high schools 115 students took courses in agriculture in 1915. A number of secondary schools have classes in elementary agriculture as part of the plan of studies.

The Journal of Agriculture, published monthly by the Department of Agriculture, is a notable publication of great practical value, containing much original information based on New Zealand conditions and requirements.

The cooperative crop experiments conducted jointly by farmers and officers of the Department of Agriculture have been a great success, and several hundred of these are always being carried out. This is a practical evidence of the high regard that farmers in general have for the usefulness of that Department, as well as of their interest in the amelioration of their practices.

No small part of the excellent esteem in which New Zealand products are held overseas is due to the extensive official arrangements in existence for grading and inspecting them before shipment. Farmers appreciate these measures, and they often take the initiative of asking for their application so as to maintain a high standard for their products.

To give an idea of the activities of the Department of Agriculture it may be of interest to indicate that it gives instruction on the preparation of dairy produce, bee keeping, orchard and garden work, alfalfa growing, hemp-milling, poultry farming, wool classing, ensilage making, viticulture, and wine-making, in addition to educating young men in the science and practice of agriculture. It gives advice on veterinary matters, field crops and pastures, and the preservation of fruit and vegetables. It conducts experiments on bush sickness, grassing kauri-gum land, hilly country, and pumice soils, and the breeding of pure-bred cattle. It inspects dairy factories, slaughterhouses, bacon factories, the manufacture of fertilizers, the packing of fruit, and the eradication of noxious weeds. It gives demonstrations in spraying and pruning trees. Its officers grade all exports of dairy produce, honey, fruit, hemp, and other products. It exhibits the products of experimental farms in agricultural shows, inoculates calves against blackleg, registers livestock brands, publishes instructive circulars, supervises and maintains commercial agencies in a number of foreign countries, encourages the exportation of fruit, etc.

GENERAL ASPECTS OF FARMING LIFE.

It would doubtless be difficult to find another country in which the farmers are more prosperous than those in New Zealand, or one in which agricultural operations are conducted in a more intelligent and progressive manner.

The New Zealand farmer usually surrounds himself with a great deal of comfort, and if in certain respects he lacks some of the conveniences of the American farmer this is not because of inability to afford them. The average homestead is substantially constructed, and is always neat and pleasant. An increasing number can truly be called country mansions, seldom surpassed in any country in the world where the owners participate actively in the management of the farm.

The thriftiness and business acumen of the New Zealand farmer are evidenced by the numerous cooperative farmers' associations in the country. In the aggregate these do, perhaps, a larger volume of business in the commodities required by the farming population than all the private firms in the country combined. One of these associations has an annual turnover approaching $20,000,000. It may be considered doubtful whether there is a single New Zealand farmer who is not a member of an agricultural or pastoral association. Every branch of farming is thoroughly organized, and every county and small settlement has its own agricultural and pastoral association. The various district and county associations are made even more influential and effective by means of federations of nationwide scope. The cooperative-association movement of New Zealand, indeed, bids fair to outdistance, proportionately, that of any other country in the world in the next few years. Agricultural machinery is handled by a great many of these associations, which, as a rule, act as agents for local manufacturers and importers. Present indications warrant the statement that in a few years the entire distribution of farm machinery will probably be in the hands of these associations.

In spite of the variations in climate, rainfall, soil, transportation, etc., rather uniform agricultural methods are followed in New Zealand. Whenever the practicability of any new ideas has been proved, New Zealand farmers, effectively aided by the Government, quickly incorporate them in their work. New Zealand farmers have evolved most original, efficient, and satisfactory methods of raising crops and stock under the characteristic conditions existing in that country.

The chief source of New Zealand's wealth lies in its soil. The entire nation recognizes this and therefore heartily supports any policies designed to promote the development of the rural industries. The Dominion farmers exert considerable influence in public affairs, and measures to increase production and to improve the quality of produce are quickly and sympathetically supported by all.

Rural economy along modern lines is thoroughly and extensively practiced. The inspection of a New Zealand farm will reveal much system and order, certain to impress the farmers of even the most progressive agricultural countries. In the purchase of supplies nothing but the best will satisfy the New Zealand farmer. He will readily pay a high price for a good article rather than purchase an inferior one. The care given to farm machinery is at least equal to that given in those countries where this detail is best looked after.

New Zealand is comparatively a new country, yet its farmers are generally well-to-do. Their policy so far has been to invest their profits in the improvement of their holdings. Their future is undeniably assured, and a few years more should see them in a position to be envied by the farmers of the most prosperous countries in the world.

While the scarcity of labor has in some instances restricted operations, it is not felt that it has retarded progress to any great extent thus far. In many cases it has made it necessary for farmers to do work that otherwise would have been done by hired labor. This has undoubtedly had the effect of making them better acquainted with all the conditions surrounding their operations and has accelerated the discovery and application of better and more remunerative farming methods. The future, however, is likely to be greatly affected by the ability to secure an adequate supply of labor. More labor will be required in order to adopt the intensive methods of farming necessary to maintain the present rate of progress. New Zealand is in a position to support a much larger population, and increased immigration will be necessary to meet this problem. It is confidently expected that immigration of the right sort will be encouraged and that this problem will be solved in the right way.

FUTURE PROSPECTS.

The agricultural resources of New Zealand are great and varied. Almost every year new records are made in the production of wealth in spite of the slow growth of its population. While its insular situation, the industrial conditions in Australia (which have brought about a substantial protection of its industries against foreign competition), and the inherent conservatism of the Dominion's inhabitants may, among other things, retard its growth as a manufacturing nation, the primary industries of the land will enable the country to continue unchecked its opportunity for development. Every condition is present, given an adequate supply of labor, to increase many times the productiveness of the soil. To do that, however, it will henceforth be necessary to alter the methods of farming now in vogue by increasing the stock-carrying capacity of the land by means of cultivated crops, instead of relying chiefly on the pastures as at present. Much of the land now supporting from two to four sheep per acre on improved pastures possesses every quality for the growing of abundant crops of forage, corn, and root crops to supply sustenance to a much greater number of sheep and cattle.

There is abundant proof that this more progressive practice will largely govern agricultural operations in the future, which fact, combined with the policy of the Government to reduce gradually the size of holdings, gives hopes that much greater areas will be used agriculturally and that farm machinery will be in much greater demand than heretofore.

IV. NEW ZEALAND CROPS AND PRODUCE.

WHEAT.

Wheat at one time ranked much higher in the list of staple products of New Zealand than it does now. Twenty-five years ago much more wheat was produced than could be consumed in the country and a heavy export trade grew up, the quantity exported in 1883 being 4,797,540 bushels and in 1890 4,467,026 bushels. Of late years the country has been showing a decided tendency toward dairying, and the relative importance of wheat has greatly declined. In only three years since 1900, namely, in 1909, 1910, and 1911, has the annual exportation of wheat reached 1,000,000 bushels. In some years the exportation has been practically nil. In 1914 the production was insufficient to meet even the local requirements, and considerable importations had to be made, some at the expense of the Government. The outbreak of the war disclosed the fact that the Dominion was actually becoming dependent on outside supplies for a part of its own consumption of breadstuffs. The Government made an appeal to the farmers to sow larger areas, with the result that in 1915 the acreage under this cereal increased by nearly 100,000—43 per cent over the preceding season. It is not improbable that the increased acreage will be maintained so as to make New Zealand (so eminently an agricultural country) self-supporting in its production of wheat, although it is doubtful whether, as long as existing economic conditions continue, New Zealand farmers will turn their attention to wheat growing at the expense of dairying and sheep raising.

Climatic conditions can not be said to be altogether favorable for the production of high-grade milling wheat in New Zealand. The grain grown, chiefly along the coast, is relatively soft and low in protein contents, because of the abundant rainfall and the humid atmospheric conditions. Millers generally have to mix it with Australian-grown wheat. Toward the interior, however, grain of excellent milling quality is produced.

The acreage in wheat in the 1915–16 season was 335,946, of which more than 6,000 acres were cut for chaff, hay, and ensilage. The largest acreage during the five preceding years was 229,600 in 1914, while the lowest was 166,774 in 1913. The average yield of wheat on the basis of the four seasons 1912 to 1915 was 28.57 bushels, the highest yield being 33.69 bushels in 1912 and the lowest 21.59 bushels in 1915.

Spring-tooth cultivators are largely used to prepare the seed bed for wheat sowing. May and June (corresponding to November and December in the Northern Hemisphere) are considered the best months for wheat sowing. Spring sowing is practiced only when autumn conditions have been unfavorable, except in the most southern parts of New Zealand, where spring sowing is almost invariably the rule. Wheat is sown at the rate of 1 to 1½ bushels per acre, usually without manure or with 100 pounds of superphosphate or basic phosphate where the land is deficient in lime. The crop is fed off in the spring, cut in February, and stacked in the field for a few weeks before thrashing. The crop is not cut when dead ripe, as in that condition it is liable to shell with the wind. In some districts it is thrashed directly from the stook by contractors' traveling outfits. The thrashed grain is bagged and carted to the granary, or more frequently stacked on a bed of straw in the field until it is transported to the railway station. The straw is stacked in the field to sustain cattle in some following winter when the paddocks have been laid down in grass.

In the chief wheat-growing districts Red Marvel, Dreadnought, Red Chaff, Pearl, Hunter's, Velvet Ear, Talavera, Tuscan, and Solid Straw Tuscan are the most popular varieties sown. In the windswept areas Marlborough and the Tuscan varieties are especially suitable, while where rust obtains Solid Straw Tuscan is often seen. Resistance to wind is, next to yield, the most important quality in New Zealand seed wheats.

OATS.

Oats are an important New Zealand crop, the combined area grown for thrashing and for chaff, hay, and ensilage being nearly double that of wheat. The southern districts, with Canterbury leading, are those in which this cereal is most extensively grown, although it is cultivated in all the agricultural districts of the Dominion. In 1915–16 there were 213,585 acres sown with oats for thrashing and 431,575 acres to be cut for chaff, hay, or ensilage.

Oats are sown in the autumn months, or in the spring, at the rate of 2 bushels per acre, invariably without manure. They are generally thrashed from the stook or are stacked in the field until wanted for chaff, when the sheaves are chaffed by contractors' traveling chaff cutters. Algerian, Green's Roakura, and Gartons are the chief varieties grown, the yields averaging about 45 bushels per acre. For the past five years the exports of oats have averaged 1,287,800 bushels per annum, the largest exports being those of 1912, when 4,123,920 bushels were exported, and the lowest in 1911, with 72,826 bushels.

A considerable but decreasing area of oats is put in in the autumn to provide green feed for sheep in winter and early spring. In the North Island, with its warmer climate and copious rainfall, oats suffer much from rust, but rust-resisting varieties such as Green's Roakura, have given good results.

BARLEY.

Barley, often mixed with oats or tares, is cultivated very largely for winter feed. In addition, it is grown for thrashing to the extent of about 30,000 acres in 1915–16, with about 2,000 acres for chaff, hay, and ensilage. The yield averages about 30 bushels per acre. The 1915 acreage was somewhat smaller than in 1900.

PEAS AND BEANS.

About 10,000 acres were devoted to the growing of peas and beans for thrashing in 1915–16. The districts of Marlborough, with 2,783 acres, and Westland, with 4,977 acres, are the chief growers of this crop. It is also of some importance in the Wellington and Otago districts.

Peas are sown chiefly between or before cereals as a preparation of the land, and also often because the weather has made it impracticable to get wheat sown in time. For this reason the area under this crop varies considerably from season to season. The variety chiefly grown is Partridge. The crop is generally stacked in the field until it is convenient to thrash it. The average yield is about 30 bushels per acre, and ordinarily about 300,000 bushels of peas are exported every year. The bean crop is the smaller one—about one-fifth that of peas. The yield averages 40 bushels.

CORN.

With the exception of a few acres all the corn grown in New Zealand is produced in the North Island. In 1915–16 there were 8,797 acres under this crop, of which 632 acres were cut for ensilage. Of the remainder a large proportion is cut and carted out to the cows when feed fails during the drier summer months. The district of Auckland grows 4,390 acres and Hawkes Bay 3,654 acres. All the other districts together had but 42 acres in corn. While the 1915–16 acreage was larger by 2,600 acres than that of the preceding season, it will be well to note that the 1910–11 acreage was 18,857. Possibly on account of the labor required and the heavy growth of weeds, the growing of corn has not so far been popular with New Zealand farmers. The increasing attention given to the growing of ensilage crops, however, justifies the hope that eventually corn will be a much more important crop than hitherto.

Corn is planted in well-tilled soils during November in drills about 3 feet apart, although sometimes it is sown broadcast. A certain amount of fertilizing is done when it is planted. Natal White, Yellow Horse Tooth, Potchefstroom, Pearl, and Red Cob Congo are the principal varieties grown. The yields range from 45 to 50 bushels per acre.

POTATOES.

Nearly every New Zealand farmer grows a small acreage of potatoes, the total area under this crop in 1915–16 being 30,000 acres. The acreage shows a very small increase, since 28,924 acres were devoted to this crop in 1900. The average yield is about 5½ tons per acre. Ten years ago the average yield was 8 tons; the decreased yield is largely due to potato blight.

The land is plowed rather deep and the tubers are carefully planted out in the plowed furrows one at a time in rows 16 inches apart and 8 inches between each set. Digging is largely done by hand. Spraying, planting, and digging by machinery is done by a few large growers who make a specialty of this crop and whose number is slowly but steadily increasing. The favorite variety is "Up-to-date," and the production is almost entirely consumed in the Dominion.

TURNIPS AND SWEDES.

To supplement winter grazing, and in order to keep the sheep in good condition, turnips and swedes are largely grown in New Zealand as autumn and winter crops. They are the mainstay of New Zealand farmers for the fattening of sheep, and on the whole these crops play a most important rôle in sheep raising in that country. The acreage has been increased by 122,696 since 1910–11, this being the only increase of consequence among New Zealand's cultivated crops.

In order to insure a good crop the land is plowed before or during the autumn months and is kept in a good state of cultivation until it is rolled and sown. The sowing season varies a great deal, for some farmers desire an autumn and winter crop and others an early spring crop. Turnips are, however, largely fed in early spring, for unless ewes are fed these before the grass begins to grow they are in danger of going back in condition. There are several methods of sowing turnips. The most popular is by means of an ordinary drill fitted with turnip seeder, almost invariably made in the Dominion, fitted to plant 14 inches apart at the rate of ½ to ¾ pound of seed per acre, with about 100 pounds of superphosphate. After drilling most farmers cultivate the land with spring-tooth harrows or light chain harrows, whereas others leave the drills open and the crop receives no further attention until fed off by ewes and young sheep. Turnips, of late years, have been increasingly planted in rows 27 inches apart and later singled out to 10 inches apart in the rows. In other cases the crop is simply sown broadcast, although this practice is not largely adhered to.

Turnips are always fed off the soil. The fields are divided in plots sufficiently large to keep the sheep feeding in them for about a fortnight. A grubber is then used to raise the previously buried parts of the turnips and the sheep after eating them up are removed to a fresh plot. Imperial Green Globe (white fleshed) is the variety of turnips most largely grown. In the wetter and colder districts Aberdeen turnips are more often grown. These are raised like white turnips. Lincoln Red turnips are also grown in a few districts.

Where the rainfall is 50 inches or more, swedes are grown. These are frequently sown in raised drills 27 inches apart and thinned and intercultivated so that a very large crop results. In some cases they are sown with ordinary drills and farmers also get good results. The average yield of turnips and swedes is estimated at 16 tons per acre.

RAPE.

About 250,000 acres are annually sown in New Zealand with rape. The land is plowed during the winter, harrowed in spring, plowed again in late spring, and cultivated with spring-tooth harrows soon afterwards. The seed is put in in early summer with 13 to 15 disk drills 7 inches apart, using about 2½ pounds of seed per acre, and from 100 to 150 pounds of guano or superphosphate. In December and January (midsummer) the rape is fed off by ewes and lambs; usually it is fed again by late lambs.

A good crop of rape will fatten 35 lambs and 10 ewes per acre in the season. This crop is considered a summer crop to supplement the summer grass so as to fatten lambs.

MANGELS.

Of late years it has been found that mangels are extremely suitable for feeding ewes in the spring. Mangels will keep till that time of the year if covered with straw. In many parts of New Zealand, however, it is difficult to grow mangels successfully, and for this reason farmers rely on turnips for fattening sheep. In the wetter districts mangels are usually sown in ridges 27 inches apart and have to be horse-hoed and afterward thinned to stand 10 to 12 inches in the rows. A great deal of work, therefore, is involved in their production, and that fact constitutes a great drawback in New Zealand. In the drier districts, however, mangels are grown on the flat in rows sufficiently wide to allow cultivating implements to be used. In some cases they are also sown broadcast.

From 4 to 6 pounds of seed per acre are used, together with 300 to 400 pounds of manure. The mangels are pulled by hand and stacked into heaps in winter and are taken to cattle and sheep during the winter months. The yields are estimated to average 50 tons per acre.

GRASSES.

Good permanent grasses are the mainstay of farming in New Zealand, and owing to the topography of much of that country, which prohibits the general use of the plow, much of its grass land is destined to remain in grass for all time. These grasses are for the purposes of feeding sheep and lambs and to a lesser extent for cattle. There are few places where there is not some growth even in the coldest months, and in all parts of the Dominion stock live, although in varying condition, without any other food than such as they can pick up in these pastures.

At two periods of the year—during the height of summer and during the winter—the grass is liable to failure, and for this reason there are sown supplementary crops. In the agricultural economy of the Dominion pasture and forage crops are beginning to merge into each other. Each is proving essential to the other. At present dairy farmers in particular and sheep farmers on arable land are beginning to realize that good pasture alone can not result in success at the present higher values of land.

Seeds for sowing pasture land are often used in the following mixture: Perennial rye grass, 25 pounds; cocksfoot, 2 pounds; timothy, 3 pounds; cowgrass, 2 pounds; red clover, 2 pounds; white clover, 2 pounds; and rape, 1 pound. The pastures are renewed at intervals of from four to eight years, according to the nature of the land. Grass is often sown with oats in autumn and spring, and with rape in early summer. A great proportion of the grass-sown land is surface-sown on bush burns, and it is not likely to come under the plow for many years to come. Only about 5,000,000 acres of grass have been sown after a proper plowing of the land. Some of the land to be sown in grass is plowed, plowed and disked, or only disked, but land for this purpose is often sown without any tillage preparation. In recent years natural pastures have been sown artificially at the rate of 250,000 acres per annum. There is no record as to the proportion sown on plowed land.

In 1914–15 there were 14,743,889 acres of sown land. In addition to the artificial pastures the returns for 1915–16 show that 16,685,580 acres were in tussock or native grass belonging to occupied holdings and available for stock feeding.

The area under grasses for seed in the season 1915–16 was as follows: Rye grass, 43,095 acres, yield 18.45 bushels of 20 pounds; cocksfoot, 13,294 acres, yield 118 pounds per acre. Many of New Zealand's standard grasses, such as cocksfoot, rye grass, and Chewing's fescue, enjoy a splendid reputation on oversea markets and are exported in values ranging from $200,000 to $350,000 per annum.

Whenever there is a great flush of grass in December so that the stock can not keep it down, each farmer usually shuts up one or two paddocks and cuts them for hay. This hay cutting usually takes place, however, only about one year in three or four.

ALFALFA.

Alfalfa is a crop that bids fair to play an important part in the agricultural economy of New Zealand if the great interest manifested in the past few years is to be taken as an indication. The Government is doing much work to stimulate the cultivation of alfalfa.

In the Marlborough district alfalfa already occupies a really important place in ordinary agriculture, but elsewhere one can find only small patches of a few acres occasionally. In the North Island considerable difficulty is being experienced in establishing it successfully owing to the growth of weeds and grasses during the colder months of the year when the alfalfa plant itself is dormant. On the whole, however, many extensive areas will doubtless be found most admirably suited to the growing of this crop.

Alfalfa is either given green to cattle or, more frequently, made into hay for winter feed for cattle and sheep. Four or five heavy cuttings per season are not uncommon wherever alfalfa is grown.

FRUIT.

Fruit growing is making good progress in New Zealand, and several thousand acres are generally added to the industry every year. Soil and rainfall throughout the entire Dominion are very suitable for fruit growing, and orchards are now to be seen nearly everywhere. The Nelson district is making particular progress in connection with apple growing.

The progressive manner in which the farmers and the Government have taken steps to foster the fruit industry is leading to an increasing demand for implements and machines to cultivate fruit orchards, and a good many power spraying outfits are also being sold.

A very profitable fruit export trade has developed in recent years, especially to South America, and 62,164 cases were shipped in 1915, as compared with 5,647 cases in 1910. The growing of apples constitutes the principal branch of the fruit industry. Pears, peaches, apricots, nectarines, and plums are also largely grown.

PHORMIUM TENAX.

The production of *Phormium tenax* is one of the most important industries of New Zealand. During the past 10 years the annual quantity of fiber produced has exceeded 24,000 tons, and the annual value of fiber exported has averaged $2,780,000. To this must be added 2,500 tons of fiber, valued at $275,000, that is locally converted into cordage and binder twine. It is claimed that the return on the capital invested in the production and manufacture of the fiber is greater than that in any other branch of the pastoral or agricultural industries of the Dominion. The area devoted to *Phormium tenax* comprises about 65,000 acres, and the return is about $50 per acre per annum. The value of the land and the machinery necessary for the extraction of the fiber does not exceed $8,750,000.

Phormium tenax is an indigenous plant of the Dominion growing in its natural state and environment without anything being done to improve it by cultivation or selection. The only thing done to maintain the fertility of the *Phormium* areas is the removal of foreign growth and the elimination of standing water by means of drains and canals, since the chief *Phormium* areas are in swamps. Indeed, if the swamps in which it grows had not proved either too costly or too difficult to drain and reclaim for agricultural purposes the industry would have been lost to the Dominion before its commercial value came to be recognized. A crop of fiber is secured every three years.

THE PASTORAL INDUSTRY: INTRODUCTION.

While special prominence is given in this report to the agricultural industries of New Zealand, since on these depends directly the use of farm machinery and implements, it is important not to lose sight of the fact that the pastoral industry is New Zealand's chief and almost sole primary production asset. For the 10 years 1901 to 1910 more than 70 per cent of the Dominion's exports consisted of pastoral produce, while this percentage during the years 1913, 1914, and 1915 was 80.60, 85.80, and 83.60, respectively. On the other hand, a certain proportion of the pastoral development of New Zealand must be attributed to the aid that agriculture is rendering to make possible an increase in its importance.

The value of all pastoral produce exported by New Zealand in 1916 was nearly $145,000,000. Wool contributed to these exports $60,276,829, frozen meats $35,385,869, cheese $17,103,390, and butter $12,810,053.

The following table gives the number of horses, cattle, sheep, and pigs in the Dominion, by land districts, on January 31, 1916:

Districts.	Horses.	Cattle, including dairy cows.	Dairy cows.	Sheep.	Pigs.
Auckland	89,671	774,862	238,156	1,705,066	85,770
Hawkes Bay	39,723	320,530	42,690	5,790,629	15,483
Taranaki	26,296	329,596	153,476	977,049	55,753
Wellington	52,245	476,985	134,826	5,475,740	51,035
Total North Island	207,935	1,901,973	569,148	13,948,484	208,041
Nelson	9,023	49,246	17,648	475,159	9,066
Marlborough	7,460	29,647	9,919	1,034,081	8,764
Westland	3,254	36,426	8,466	63,354	3,010
Canterbury	69,589	149,900	58,339	4,493,188	42,964
Otago	42,849	123,000	45,864	3,024,121	15,834
Southland	31,221	127,299	40,939	1,749,763	9,822
Total South Island	163,396	515,518	181,175	10,839,666	89,460
Total for Dominion in 1916	371,331	2,417,491	750,323	24,788,150	297,501
Total for Dominion in 1911	404,284	2,020,171	633,733	23,996,126	348,754
Increase	....	397,320	116,590	792,024	....
Decrease	32,953	....	....	....	51,253

SHEEP AND WOOL.

The Dominion is eminently suited for sheep breeding—to an extent, in fact, that is hardly surpassed by any country in the world. Its wool and mutton and lamb enjoy the highest reputation on oversea markets. In the South Island, where meat production is the chief consideration, the merino furnished the foundation of the crossbred stock, and in the early days it was crossed with the English Leicester. Of late years the Lincoln has largely superseded the Leicester. In the North Island the Romney, which is best suited to the moist climate, has become the most popular breed, and its popularity is also increasing in the South Island. The Lincoln and Border Leicester are also favored in both islands, while the Southdown is displacing other breeds for fat-lamb production. The English Leicesters are still the most popular sheep in the South Island. The crossbreds and other long-wools comprise 92 per cent of New Zealand's flocks. In 1907 there were 10,854,018 sheep in the North Island and 10,129,754 in the South Island, showing that, while in the latter island the number of sheep has remained about the same for the past 10 years, the number in the North Island has increased by more than 36 per cent.

In 1916 4,018,578 sheep were slaughtered in New Zealand, of which 2,985,268 were exported; 4,091,085 lambs were slaughtered, of which 3,750,590 were exported. The New Zealand consumption therefore was 1,033,310 sheep and 340,495 lambs, to which must be added about 450,000 sheep and 55,000 lambs estimated to have been killed by farmers for local consumption. It is of interest to note in this connection that in 1915 New Zealand shipped 6,494,197 carcasses of frozen lamb and mutton to the United Kingdom against 3,582,911 and 2,111,596 shipped by Australia and South America, respectively; in other words, New Zealand shipped more carcasses to the United Kingdom than those two continents combined.

The production of wool is the oldest and at the same time the most valuable of New Zealand industries. Wool easily maintains its position in point of value at the top of the list of the Dominion's exports.

For the year ended September 30, 1915, 208,908,118 pounds of wool were exported and 6,628,019 pounds were purchased by local woolen mills. In 1915–16 New Zealand exported nearly 36 per cent of all the wool exported by Australasia. The average value per bale of all the wool sold in Australasia during the season 1915–16 was about $15 greater than in the preceding year.

CATTLE.

The number of cattle in the Dominion shows a steady increase from year to year, having doubled since 1900. While both beef and dairy cattle have continually increased, the latter type has shown a proportionately greater advance since 1911.

Beef Shorthorns, Aberdeen-Angus, and Hereford are the chief beef breeds, whereas Jersey, Holstein, Ayrshire, and milking Shorthorns are the chief dairy types bred.

An important factor in the improved position of dairy cattle in New Zealand is the milking machine, which is making the farmer more independent of hired labor. Dairying is being conducted on a sound basis, and the outlook of the industry is most promising.

While the farms are fairly large the increasing price of land works toward smaller farms and the keeping of fewer but better cows. There is also a growing realization of the necessity of a more liberal system of feeding, particularly in the direction of growing special fodder crops to maintain the milk flow at all seasons of the year.

The district of Auckland is the premier cattle district of New Zealand, having increased the number of cattle by nearly 50 per cent since 1911. The North Island has 79 per cent of the total number of cattle and 76 per cent of the dairy stock. The exports of frozen and chilled beef are not as large as those of lamb and mutton, and only about 28 per cent of the cattle slaughtered is exported. Beef exports, however, show a very pronounced increase during the past five seasons. In 1912, 210,629 hundredweight of beef were exported, whereas 750,938 hundredweight were exported in 1916.

DAIRY PRODUCE.

In 1916 there were 173 butter factories and 381 cheese factories in the Dominion against 189 and 194, respectively, in 1910. The exports of butter were 356,535 hundredweight in 1910 and 420,144 in 1915. The exports of cheese in these years were 451,915 and 817,258 hundredweight, respectively. These figures show that the outstanding feature of the dairy industry is the enormous development in the production of cheese. The North Island produces 78 per cent of all New Zealand cheese, the district of Taranaki alone producing nearly one-half. The districts of Otago and Southland are the only districts of the South Island where the cheese industry is at all important. The North Island produces 93 per cent of all the butter made in New Zealand, the district of Auckland making more than one-half of all the butter. Taranaki is next in importance in butter production.

V. CONDITIONS IN AGRICULTURAL-MACHINERY TRADE.

STATISTICS OF IMPORTS.

The imports of agricultural implements and machinery into New Zealand during the four years 1913 to 1916, by countries of origin, were as follows:

Articles and countries of origin.	1913	1914	1915	1916
Cleaners, grain and seed:				
United Kingdom	$268	$107	$667	$1,022
Canada	....	779	....	277
Switzerland	....	....	....	608
Australia	584	....	....	....
Germany	380	....	....	....
United States	5,577	2,764	2,910	1,781
Total	6,809	3,650	3,577	3,688
Cultivators, spring-tooth:				
United Kingdom	1,664	4,443	4,467	3,815
Canada	5,947	14,094	6,453	8,930
Australia	1,295	905	876	2,385
United States	6,078	6,142	3,747	4,370
Total	14,984	25,584	15,543	19,500
Cutters, chaff; oat bruisers; turnip slicers:				
United Kingdom	5,524	4,448	3,397	2,438
Canada	219	394	....	209
Australia	243	....	....	10
New Zealand [1]	73	88	29	5
Total	6,059	4,930	3,426	2,662
Drills and sowers:				
United Kingdom	1,494	1,533	730	277
Canada	34,937	73,659	14,415	10,156
Australia	521	39	....	....
United States	43,414	44,037	28,250	21,267
Total	80.366	119,268	43,395	31,700
Harrows, disk:				
Canada	11,806	24,240	10,857	11,616
Australia	574	78	....	....
United States	16,658	17,436	3,115	8,653
United Kingdom	3,086	7,446	1,382	....
Total	32,124	49,200	15,354	20,269
Harrows, other than disk:				
United Kingdom	7,567	8,375	6,901	13,597
Canada	1,368	2,662	1,732	4,954
New Zealand [1]	....	....	....	34
Australia	827	35	....	....
Germany	....	97	....	....
United States	7,183	11,801	11,709	12,045
Total	16,945	22,970	20,342	30,630
Hay rakes and tedders, horse:				
United Kingdom	10,200	905	302	1,153
Canada	21,554	5,509	4,662	321
Australia	1,110	73	....	....
United States	28,303	14,200	6,764	6,219
Total	61,167	20,687	11,728	7,693
Horse grubbers, horse hoes, scarifiers, and scufflers:				
United Kingdom	1,528	209	380	370
Canada	564	1,280	92	131
Australia	516	....	....	448
United States	4,171	3,806	2,122	1,260
Total	6,779	5,295	2,594	2,209

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[1] Goods that originated in New Zealand and were returned from other countries.

Statistics of imports—Continued.

Articles and countries of origin.	1913	1914	1915	1916
Mowers, horse:				
United Kingdom	(1)	$8,550	$1,475	$2,856
Canada	(1)	14,127	12,925	1,319
Australia	(1)	....	....	516
United States	(1)	19,754	8,983	10,643
Other countries	(1)	....	15	....
Total	(1)	42,431	23,398	15,334
Plows:				
United Kingdom	$11,329	6,429	6,073	3,810
Canada	3,460	13,037	3,601	6,171
Australia	3,708	1,718	1,032	1,304
Germany	....	107	....	....
United States	35,530	26,493	22,668	39,516
Total	54,027	47,784	33,374	50,801
Presses, wool, hay, and straw:				
United States	243	1,810	219	3,674
Reapers and reapers-and-binders:				
United Kingdom	4,862	2,020	....	....
Canada	76,019	10,234	39,404	64,841
Australia	282	589	....	399
United States	44,446	41,472	37,842	55,094
Total	125,609	54,315	77,246	120,334
Rollers, field:				
United States	....	....	170	170
United Kingdom	112	....	....	....
Total	112	....	170	170
Shearing and horse-clipping machines:				
United Kingdom	14,176	12,657	8,044	8,988
Australia	1,888	....	39	127
France	....	....	....	29
Canada	491	....	....	....
Germany	200	102	102	....
United States	14,332	21,379	6,463	17,047
Total	31,087	34,138	14,648	26,191
Thrashing machines:				
United Kingdom	5,971	11,305	....	....
Australia	603	....	....	....
United States	1,091	8,482	4,798	3,110
Total	7,665	19,787	4,798	3,110
Other agricultural implements, machinery, and machines, including materials for and parts of agricultural implements, etc.:				
United Kingdom	176,527	190,402	161,003	196,237
Canada	60,456	38,319	28,649	26,902
Australia	16,600	11,470	18,157	13,836
France	1,027	102	4,842	1,139
Germany	1,679	3,776	....	29
Fiji	224	....	....	....
New Zealand [1]	....	35	15	....
Russia	....	....	15	....
Sweden	....	....	....	691
Switzerland	49	....	....	....
United States	86,419	96,045	51,332	101,505
Total	342,981	340,149	264,013	340,339

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[1] Included in "Hay rakes, etc."

A compilation of the above figures gives the following totals for the principal countries and shows that the average value of farm-machinery imports is $697,771 per annum:

Countries of origin.	1913	1914	1915	1916	Total for four years.
United Kingdom	$244,308	$258,829	$194,821	$234,563	$932,521
Canada	216,821	198,334	122,790	135,827	673,772
United States	293,445	315,621	191,092	286,354	1,086,512
Australia	28,751	14,907	20,104	19,025	82,787
Other countries	3,632	4,307	5,018	2,535	15,492
Total	786,957	791,998	533,825	678,304	2,791,084

The following table shows, by ports, the value of the imports of farm machinery in 1916 into New Zealand, together with the number of implements in each category imported:

Articles.	Number.	Auckland.	Wellington.	Lyttelton.	Dunedin.	Other ports.	Total.
Cleaners, grain and seed	68	$2,823	....	$428	....	$438	$3,689
Cultivators, spring-tooth	673	3,085	$1,528	6,828	$6,891	1,168	19,500
Cutters, chaff; oat bruisers; turnip slicers	151	2,059	599	5	....	....	2,663
Drills and sowers	749	16,814	7,533	5,728	599	1,027	31,701
Harrows:							
Disk	781	10,740	5,134	1,664	2,730	....	20,268
Other than disk	2,070	15,013	8,239	3,664	2,477	1,212	30,605
Hay rakes and tedders, horse	371	2,360	3,504	550	258	1,022	7,694
Horse grubbers, horse hoes, scarifiers, and scufflers	402	1,411	341	156	29	273	2,210
Mowers, horse	342	6,755	6,404	107	457	1,611	15,334
Plows	2,796	34,883	4,331	5,996	2,779	2,813	50,802
Presses, wool, hay, and straw	14	1,684	1,674	316	....	....	3,674
Reapers and reapers-and-binders	1,296	11,986	15,986	54,442	37,521	399	120,334
Rollers, field	6	....	170	....	....	....	170
Shearing and horse-clipping machines	2,482	7,825	8,677	4,132	3,611	1,947	26,192
Thrashing machines	12	....	3,110	....	....	....	3,110
Other	....	57,780	97,130	101,583	42,183	41,633	340,309
Total	....	175,218	164,360	185,599	99,535	53,543	678,255

FARM-MACHINERY MANUFACTURING IN NEW ZEALAND.

The manufacture of farm machinery in New Zealand started as long ago as 1869 or earlier. Four of the 19 factories now in existence were established during the period 1860–1869, three during 1870–1879, one during 1880–1889, three during 1890–1894, three in 1905, and two in 1907.

The value of the manufactured product and the number of hands employed for a period of years have been as follows:

Years.	Number of hands.	Value of manufactured product.
1890	....	$703,073
1895	581	496,646
1900	586	672,034
1905	793	972,039
1910	646	1,070,825

The smaller number of employees in 1910 is possibly to be accounted for by the fact that more machinery and more advanced methods of production were employed, since the value of the output between the years 1905 and 1910 increased by $98,786, while the number of factories decreased from 29 to 19.

It is natural that the South Island, because of the larger extent to which cultivated crops are grown, should show much greater activity in the manufacture of farm machinery than the North Island. Fourteen of the 19 factories in existence in 1911 were in the South Island—7 in Canterbury, 2 in Otago, and 5 in Southland. The North Island had 1 factory in the Hawke's Bay district and 4 in the Wellington district. While definite information is not available it may be safely said that the factories of the North Island are of much less importance than those of the South Island.

The statistics compiled in connection with the census of 1911 are the latest available. They furnish the following particulars concerning this industry: Number of factories, 19; hands employed, 646; wages paid, $394,313; horsepower employed, 426; cost of materials, $395,339; value of output, $1,070,825; approximate value of lands, buildings, machinery, and plant, $577,318.

Some of New Zealand's implement factories are equipped with high-class machinery and fitted with many modern appliances. In order to satisfy the requirements of individual farmers, however, a great deal of work is done by hand, which is also necessary in order to turn out the great variety of types and equipment that is offered to the trade.

Nearly all the machines required in New Zealand agriculture, with the exception of binders, mowers, and other harvesting machines, are made locally, and the manufacturers of that country have in late years shown much enterprise in adding to their production substantial lines such as tractor plows, drills, disk plows, contractor's chaff cutters and thrashers, windmills, and turnip machinery. That the goods turned out in the country are very substantially and carefully made must be obvious when it is realized that all farm machinery enters New Zealand free of duty, and the local manufacturers, therefore, have to compete with the large American and English factories.

The industry, from all appearances, has made very good progress since the figures for the 1911 census were obtained, which is largely due to the greater attention given by farmers to the raising of cultivated crops to supplement the natural grazing of their farms. The advent of the milking machine, which the Dominion has perhaps done more to bring to a high state of perfection than any other country, is another factor likely to have stimulated greatly the growth of the industry in recent years. Perhaps as many as 20 factories have been established since 1911 with the sole object of manufacturing milking machines. Some of these machines have been patented in foreign countries, and it is stated that in one or two cases American manufacturers have taken up their manufacture on the basis of the New Zealand designs and patents.

The exportation of chaff cutters to Australia and of wool presses to Argentina and Uruguay has attained relatively substantial proportions. Certain types of plows are exported to Tasmania and South Africa, and in very small quantities to Canada, England, South America, and Scotland.

OUTSTANDING FACTORS OF FARM-MACHINERY DEMAND.

While New Zealand derives most of its wealth from its soil, the preceding review has doubtless shown that pastoral conditions still largely prevail in that country. The demand for farm machinery, therefore, is not as large as might be inferred if the value of the farm produce exported were considered without a just understanding of the important rôle that the vast and excellent grazing lands play in its production. Agriculture, indeed, except in the districts of Canterbury and Otago, where the breadstuffs of the country are produced, is nearly always forced upon the farmers by the necessity of raising forage crops to provide food for stock during certain seasons of the year.

Except perhaps in connection with the reclaimed swamp areas, there is no good reason why implements such as are used in the United States should not give entire satisfaction in New Zealand. The fact that the demand for American machines is, on the whole, rather small may be attributed chiefly to the origin of the inhabitants, which has made them prefer machines built along the lines of those made in Great Britain, with which they are more or less acquainted. Since the early days of its agricultural development, moreover, factories and shops devoted to the making of farm machinery have existed throughout New Zealand; since their inception these have offered to give the farmers machines largely made in accordance with their own views and ideas, and this has further made them averse to the use of the standard types of farm machinery produced in the United States. These remarks apply chiefly to plows. The other machines used in New Zealand are rather similar to those made in the United States, although local makers have almost invariably strengthened and otherwise changed them to meet the requirements and views of their customers, who have always manifested a pronounced liking for strong and durable implements.

VI. MARKET FOR PARTICULAR LINES OF EQUIPMENT.

PLOWS.

Generally speaking, the plows used in New Zealand for the secondary branches of farming, such as vegetable growing, orchards, etc., are of foreign manufacture, whereas those used in preparing the land for cereals and root crops and in improving grass lands (the more important agricultural operations of the Dominion) are of local manufacture.

It should be remarked that in most cases New Zealand soils are not easy to plow. The preponderance of swamps (which, once reclaimed, are converted into rich arable land), the frequency with which clay soils are met, and the rather stiff and heavy nature of the soils in general, added to the presence of gravel and stones, make necessary the use of heavy and simply constructed plows. Conditions, furthermore, vary so much that local requirements have to be carefully known and met, and it is obvious for this reason that local goods have an advantage, even if the prices are considerably higher, over those that are imported.

While there is a considerable demand for plows in New Zealand the bulk of those used are of local manufacture. The value of those imported is slightly more than $50,000 per annum, and of these the United States supplies about four-fifths.

Imported plows are of many different kinds; there is not a large enough demand for any particular type to make the New Zealand market worthy of special or expensive efforts.

WALKING PLOWS.

Partly because the demand is rather varied, and not of great importance on the whole, the bulk of the walking plows used in New Zealand are imported.

Chilled plows of the ordinary American type with 9 and 11 inch plain or reversible slip nose shares, with wood handles and either wood or steel beams, are largely used on the farms where only small tracts are cultivated, and for general orchard work. They are supplied with gauge wheel and one extra share. Twelve-inch chilled plows with steel and wood beams and fitted with cutter shares are also in some demand. Low well-turned moldboards are preferred. Three-horse chilled plows with 13 and 16 inch shares are quite popular for heavy clay, gritty soils, and stony lands. They are equipped with slip nose shares, 13-inch rolling coulters, and circular gauge wheels, and at times with fore-carriages of the two-wheel type. Iron handles and marsh cutter shares are frequently sold with them, and some farmers want also steel shares and moldboards to fit them. These plows are preferred when substantially constructed and equipped with general-purpose moldboards. Chilled middle-breaker plows to open ridges for potatoes and other root crops, fitted with shares turning two furrows each 8 inches wide, are also in growing demand.

Steel walking plows are also often used for work similar to that done by chilled plows, but in a special manner to break new lands; 7, 8, 9, 11, 12, and 14 inch plows are all more or less in demand, and these are like those used in the United States. Almost invariably they are wanted with steel beam and wood handles, equipped with single or double stem gauge wheel, and occasionally with fore-carriages. Chilled shares are sometimes supplied with these plows, as well as jointers or standing cutters, although more often rolling coulters. Beams are generally well curved to permit of good clearance. Walking plows of the Colonial or English type, with long moldboards, leaving long even furrows at an angle on top of the previous one, and with small cut shares and high straight beams, curving abruptly where next to the bottom, are in great favor for handling difficult soils. Canadian and American manufacturers supply a good many of these, but the local makers have the bulk of the trade. As a rule they are equipped with the fore-carriage type of gauge wheel and with rolling coulter, and supplied with either cost or steel shares.

Reversible walking plows, owing to the hilly nature of a great many sections of New Zealand, are in good demand. One and two horse wood-beam plows fitted with single stem gauge wheels, chilled shares, steel moldboards, jointers, and rolling coulters are sold, the preference being for those that are adjustable to cut a wider or narrower furrow. A very popular type of hillside plow in New Zealand has a steel trussed beam, adjustable handles, an automatic coulter and jointer that remains always in line with the cutting edge, and a shifting clevis to regulate the width of the furrow.

One-horse vineyard plows with steel beam, low-front, soft-center moldboard, chilled landside, and steel or chilled share are in some demand for orchard work. They are fitted with dial clevis and draft chain and have adjustable handles.

GANG PLOWS.

For orchard work a two-furrow gang with direct beam hitch, and short beams that are abruptly bent at the rear and are also high placed, is in great favor. The wheels are placed in a parallel position so that when the bottoms are raised they travel back under the frame to make it easy to turn the plow. The axles are adjustable to make the distance between the wheels narrower or wider. These plows are equipped with an adjustable rear handle, reversible clevis that gives a wide range of adjustment, and low front 7-inch moldboards. They weigh about 200 pounds.

A few high lift single and double furrow plows of the American type have been sold in New Zealand. It is difficult to express an opinion as to whether a good demand for them may eventually develop. Owing to the scarcity of labor it is felt that if proper efforts are made to popularize them fairly good results will follow, yet the demand at its best would be relatively so small that it will hardly pay for manufacturers to go to any great expense in this connection. Importers prepared to make some efforts in that direction should be given all the support possible.

The simpler type of American sulky plow, without the high lift frame, in one, two, and three furrows, is also being sold to a small extent, but here again it is doubtful whether it will make much headway in replacing the heavier and simpler plows to which New Zealand farmers are accustomed.

TRACTOR PLOWS.

A number of tractor plows, such as are made in the United States, with two and three bottoms, have been sold in New Zealand during the past two years. The increasing number of tractors in that country makes the prospects of their sale rather promising. It is felt that if they were equipped with bottoms of the English type, so popular in New Zealand, the prospects of American manufacturers would be vastly improved. So far general-purpose and breaker moldboards have rather pleased the users, but the manufacture of similar plows in New Zealand has already started (the construction following the heavy lines typical of all the plows used there, and the English type of moldboard being supplied with them), and it will therefore be increasingly essential to give proper attention to the moldboard question if American manufacturers are to keep the trade they are now enjoying. When everything is considered, however, the prospects of American manufacturers are rather promising, and adequate efforts to meet the requirements as closely as possible will doubtless be justified. Plows that may be changed from two to three bottoms and vice versa appear to be rather favored.

DISK PLOWS.

For plowing stubbles and preparing land for a catch crop, as well as to plow very hard ground and to work among roots, stumps, gravel, and bowlders, disk plows are sold (chiefly in the South Island) to the extent of approximately 200 per annum. In former years the demand for disk plows was greater, but farmers have lately shown a greater preference for moldboard plows that will be able to do the work indicated. The disk plows sold are of the type common in the United States. The demand is principally for two-disk plows, but one and three disk plows are also sold. Types convertible into larger or smaller plows are preferred.

A fair number of reversible disk plows, usually with 24-inch disks but occasionally with 20-inch disks, are also sold.

CHARACTER OF LOCALLY MADE PLOWS.

The plows manufactured in New Zealand are constructed with the view of satisfactorily withstanding very severe usage. As stated elsewhere, New Zealand soils are usually difficult to plow. Most of the land broken is covered with a heavy growth of grass, and is often hilly, undulating, and swampy. The outstanding features of plows made in New Zealand are strength and simplicity. There are perhaps no plows made elsewhere that, in proportion to their weight, have so few parts.

The single-furrow moldboard plows most extensively sold are of as substantial a construction as the two and three furrow plows; in other words, the three sizes are similarly constructed except in the number of furrows. In the single-furrow plow the beam, the standard on which the bottom is built, and the rear end that supports the rear wheel and serves as the plow handle are all made of one piece. The draft head of the plow, in the majority of cases, is welded to that piece. To this piece the three wheels are attached, the front furrow wheel well in front of the plow, the land wheel in the center, and the rear wheel on the rear right hand of it. The land and furrow levers are also built on this piece.

So far as styles are concerned it can be said that there is only one type of plow manufactured in New Zealand. On the other hand, this type is made in various degrees of strength—very light, light, medium, heavy, and very heavy. The majority of manufacturers offer to build heavier plows to order. They are also constructed in what are termed short and long styles, the short style being often preferred in hilly land.

Great importance is attached by manufacturers and farmers to the construction of the wheels, and much care is exercised in this connection. They are very strong and equipped with features making them light running and easy to lubricate and keep in good working condition. Rolling coulters, rigid and swivel, are nearly always an inseparable feature of these plows and, together with the wheels, they are a feature in which the manufacturers try to excel each other; otherwise a general and uniform type of construction is adhered to very closely by the various manufacturers of New Zealand.

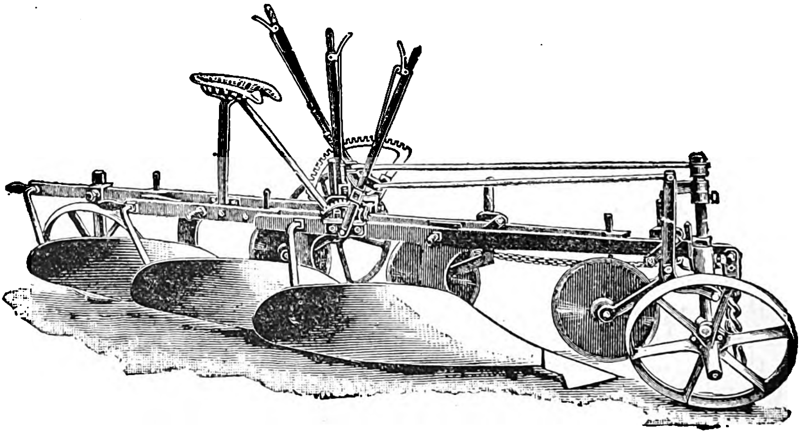

FIG. 24.—Three-furrow moldboard plow, made in New Zealand.

The bottoms are either of the long English type, to leave the furrow at an angle on top of the preceding one, or with long moldboards abruptly bent on the upper part, to bury effectively heavy growths of grass and weeds. Either steel or chilled cast shares are furnished. Jointers are sometimes used, as well as riding attachments, for both of which an extra charge is made. The single plow is frequently supplied with an extra moldboard to convert it into a ridging plow to plant potatoes, turnips, mangolds, etc. The front wheel lifting lever is considered an extra.

Single-furrow plows are often constructed so that they can be converted into double-furrow plows. The latter size is the one most largely used in New Zealand. One of the leading manufacturers claims to have built 23,000 of them so far, and is turning them out now at the rate of 1,000 per annum. On the gang plows certain manufacturers weld the beam braces into each other.

SWAMP PLOWS.

There are large areas of land in New Zealand that for many years were covered with swamps. These are being rapidly reclaimed by means of drainage, as they have proved to be extremely fertile when put into proper physical condition. It is obvious that a heavy growth of brush is one of the characteristics of these lands, and with this in view very heavy plows have been evolved to bury this growth and to bring enough soil on top of the roots to permit the growing of crops. Perhaps seven or eight hundred plows for this work are manufactured and sold in New Zealand every year. Some of their dimensions, together with the accompanying illustration (fig. 25) will give an idea of the general character of these plows. The length over all is 10 feet, the length of the beam also 10 feet and its size 4½ by 1⅞ inches, the coulter 24 inches in diameter, and the share 18-inch cut. The moldboard is 5 feet 3 inches long and 20 inches wide. The approximate weight is 1,325 pounds and the price $175. A chain is used to help in burying rushes and scrub, which sometimes is 20 feet high. The beam is sometimes reinforced with a piece of hardwood 3 to 4 inches square.

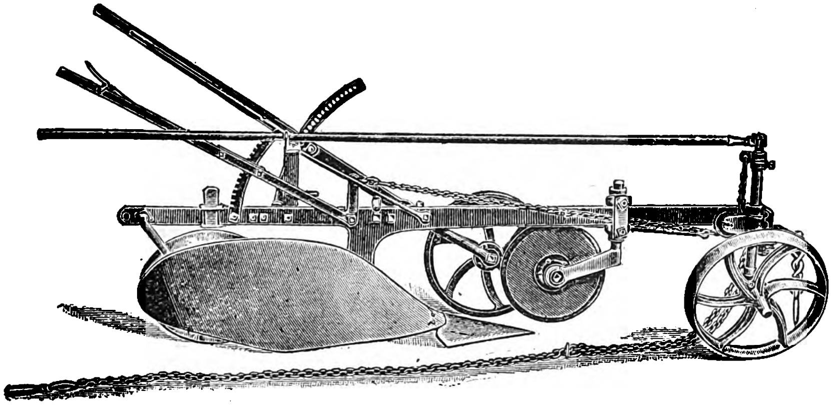

FIG. 25.—Swamp plow, made in New Zealand.

HARROWS.

DISK HARROWS.

The use of disk harrows is quite general throughout the agricultural areas of New Zealand. The imports of disk harrows, however, have averaged only about $30,000 during the past four years. The reason for these small imports is to be found in the fact that the local manufacturers supply the bulk of the demand. Indeed, little encouragement can be given to American manufacturers in connection with the New Zealand demand for disk harrows, for not only have the manufacturers of that country proved capable of turning out excellent machines, but they have also created a demand for widely differing types which, in view of the small aggregate demand, American manufacturers could not find it profitable to supply.

The demand for disk harrows of the American type is not large. When these are sold the standard sizes are 6 and 8 feet with either 16 or 18 inch disks. A few are supplied with cutaway disks and the bulk with forecarriages.

What may be termed the English type of disk harrow, illustrated and described in the writer's South African report (p. 137), is the most popular machine of this kind in New Zealand. A Christchurch manufacturer claims that he was the originator of that type of disk harrow. These harrows are made with either wood or steel frames in 5, 6, 7, 8, 9, and 10 foot sizes, with 18-inch disks. All the large New Zealand manufacturers produce this type of disk harrow, there being very few of them imported.

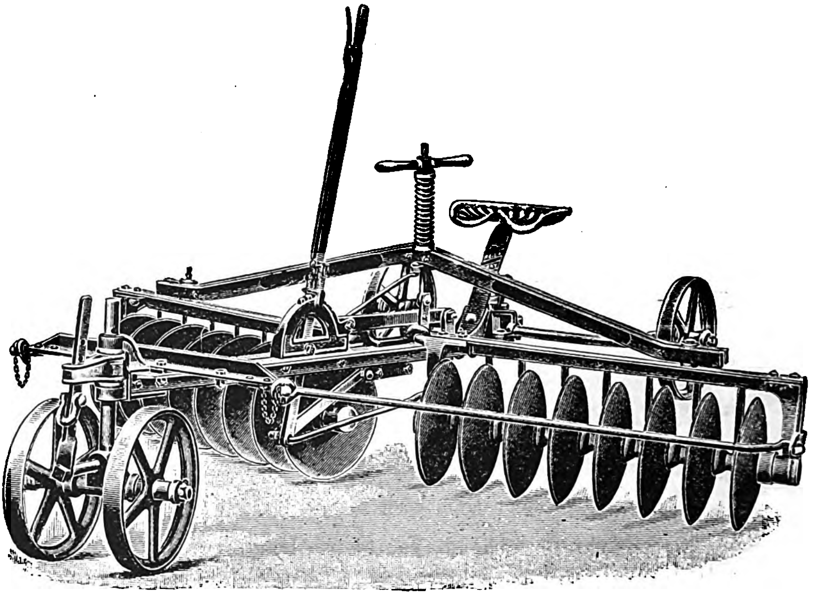

FIG. 26.—Flexible disk harrow, made in New Zealand.

For hillside or rough work some wood-frame inthrow disk harrows are still made and sold in New Zealand. Small 3, 4, and 5 foot disk harrows for one or two horses are also manufactured and sold to some extent in New Zealand.

Reversible orchard disk harrows, with gangs to be set either close together for ordinary work or at the ends of the frame for orchard work, made for inthrow and outthrow cultivation, are both imported and manufactured in New Zealand.

During the past few years a disk harrow with an equalizing pressure bar and center screw rod and spring to allow the gangs to adapt themselves to the uneven ground have become very popular where the soils are hard and difficult to pulverize and cultivate. An illustration of this harrow is shown herein (fig. 26), as some of its features may interest American manufacturers. In view of the relatively small demand for these in New Zealand and the competition of local makers, American manufacturers will hardly be warranted in developing a machine along this line with only the New Zealand trade in view.

SPRING-TOOTH HARROWS.

Sulky spring-tooth high-frame harrows in 6 and 8 foot sizes with 13 and 17 teeth, respectively, and with independent gangs are sold in New Zealand in fair quantities, although not to the same extent as disk harrows. English and Canadian manufacturers share with the local makers the demand for these machines. They are strongly constructed and have all the best features of harrows of this type.

Some sulky spring-tooth high-frame harrows with all the teeth attached to a steel frame running the entire length of the machine are also sold in New Zealand in the 4, 5, and 6 foot sizes with 5, 7, and 9 teeth, respectively.

Lever low-frame spring-tooth harrows in one section with 9 teeth, two sections with 15 or 17 teeth, and three sections with 25 teeth, are in demand in New Zealand, and a good trade is done with imported machines, including some American makes.

Many of the spring-tooth harrows sold in New Zealand are supplied with grass-seeder attachment.

SPIKE-TOOTH AND CHAIN HARROWS.

There is a very large but varied demand for spike-tooth and chain harrows in New Zealand. While local manufacturers supply the largest number sold, imported machines are also frequently seen.

Zigzag harrows, square steel spike harrows, caterpillar or flexible bar harrows, stump-jump and several other types of spike-tooth harrows are sold.

For leveling down land and for scattering animal droppings on grassland, chain and steel tripod harrows are largely used. For this work spike-tooth harrows, turned upside down, are also used.

One of the features of the demand for spike and chain harrows is their size. They are offered to the farmers from 3 to 12 feet deep and 6 to 18 feet wide. Harrow carts or riding attachments are often sold with them.

ROLLERS AND CRUSHERS.

Cambridge rollers with hardwood or steel frames, forecarriage, and seat, and with plain, notched, or heavy wheels or rims, 22, 24, 26, or 30 inches in diameter, with 2 to 2½ inch axles, and in 6, 7, 8, and 9 foot sizes, are sold to some considerable extent in New Zealand. Grass-seeder attachments are frequently supplied with them.

In laying down pastures a fine firm bed is usually desired, and this is obtained by rolling the land. These machines, for this reason, are sold in fairly large numbers.

CORN PLANTERS.

The acreage planted with corn in New Zealand is small. The demand for corn planters, therefore, is not important. Single-row planters with fertilizer attachment, chain drive, and concave press wheel, to drop the seed at intervals of 8, 11, 13, 15, 19, and 24 inches are largely the machines used in this connection. Some two-row planters with check-row and fertilizer attachments are also sold.

CULTIVATORS.

New Zealand manufacturers have taken up the construction of one-horse cultivators and horse hoes, which very closely follow the construction of those made in the United States. Besides being used in the cultivation of corn, they are also in demand for ridging, hoeing, and cleaning turnip land, and for grubbing potatoes, mangolds, and carrots. Some imported machines, chiefly American, are rather popular.

A few riding cultivators like those used in the corn-growing districts of the United States are imported into New Zealand.

A great deal of interest has lately been shown in the growing of alfalfa, and some demand will undoubtedly develop for alfalfa cultivators.

DRILLS AND SEEDERS.

There is a considerable demand for grain drills in New Zealand, which is still largely supplied with imported (chiefly American) machines. While the area under cereals is not very large, drills are extensively used in connection with grass-seeding operations, and also for root crops. All the drills sold are of the fertilizer type. The features mostly in evidence are high and wide wheels, hoppers of large capacity, rigidly braced frames, fluted style of grain feed, star fertilizer feed, and 7-inch spacing between disks or hoes. The most popular sizes are 9, 11, and 13 row machines. Larger drills are generally used in the South Island than in the North Island. Hoe drills are sold oftener than disk drills.

A very large percentage of the drills sold are wanted with special turnip-seeder attachment. Owing to the importance of this and similar crops in New Zealand local manufacturers have evolved very satisfactory attachments of this kind—so much so that it is felt that it would be inadvisable, in view of the thoroughly adequate goods produced in New Zealand and the many problems involved in designing them, for American manufacturers to go to the trouble of supplying these for the drills shipped to New Zealand. It is one of the features of this trade that turnip-seeder attachments will be furnished by local drill manufacturers for machines other than their own.

In recent years local manufacturers have created an enviable reputation for their drills. Some of them boast of the fact that farmers will readily pay $50 more for one of their drills than they will pay for an imported machine of equal size and similarly equipped. This development indicates that in all probability American drill manufacturers will find it increasingly difficult to compete with New Zealand makers for the drill trade of that country.

Both hoe and disk drills, with five furrows, of the fertilizer type, are sold to some extent in New Zealand, chiefly in the North Island.

Force-feed broadcast grain and grass seeders for one horse, with both wooden and steel frames, 16 and 18 feet wide, are largely sold in New Zealand. These are made by local manufacturers so that they can be easily converted into turnip, rape, and mangold seeders.

Lime is much needed by New Zealand soils, these being often full of acid as a result of the moist climate and the decaying vegetable matter. Consequently, in recent years a considerable demand has arisen for lime and fertilizer distributers. To encourage the application of lime in particular the New Zealand Government carries it free on the railways for a distance of 100 miles. These machines are constructed to regulate the quantity of lime to be distributed. Star feeds are chiefly used. Hoppers should have a capacity of about 600 pounds of lime. Eight and 10 foot machines with steel or wooden wheels, 48 inches high and 4 inches wide, are the most popular. While New Zealand manufacturers are making good progress in supplying the demand, a fair business is done with imported machines.

POTATO MACHINERY.

Conditions are favorable in New Zealand for the growing of potatoes, and while dairying occupies most of the farmers' attention it is not improbable that potatoes will eventually be grown on a large commercial scale.

At present much of the work connected with potato growing is done by hand, but the recent introduction of modern potato machinery has met with such success that a number of the most advanced types of these machines are now sold every year.

Undoubtedly as farmers become familiar with the labor-saving features of modern potato machinery there will arise an increasing interest in the cultivation of that crop, and American manufacturers may eventually be able to create a considerable demand for these goods in New Zealand. On the other hand, the general lines of potato machines, resembling in many ways those used in the growing of turnips and other root crops, may induce the manufacturers of New Zealand to take up their construction as soon as these goods have come to be frequently sold in that country. Indeed, a small beginning in this direction has already been made by one of the local manufacturers.

TURNIP MACHINERY.

Because of the important rôle that turnip and root crops play in the pastoral industry of New Zealand and the difficulty of obtaining labor, there has developed an insistent demand in recent years for machines to make possible the cultivation of those crops on a large scale. The New Zealand manufacturers have not been slow in realizing this; they have already devoted much skill and time to the development of machines to meet this want, and they have reached a degree of perfection that has probably not been attained in any other country so far as machines for such crops are concerned.

These remarks are not intended to convey the idea that American manufacturers should be encouraged to make any special efforts to supply part of the New Zealand demand for these machines. Their general construction is indicated merely with the object of pointing out certain of their features that may be of interest.

TURNIP RIDGERS.

To sow the manure, set up the drill, roll it, sow the seed, and cover it, a two-row machine is largely used in New Zealand, enabling the farmer to do about 8 acres per day. This machine can be set to make two drills from 22 to 28 inches apart, and is equipped with a double fertilizer hopper to sow two separate kinds of manure, or one kind of manure, in any quantity. Quite often farmers desire to sow coarse manure in the drill while a fine class of quick-starting manure is often sown near the top of the drill with the seed. The seed hopper is also divided, so that one side may be used for rape and the other for turnips. These sides can be used separately or together. These machines are so constructed as to permit of their sowing turnips, rape, carrots, and other small seeds.

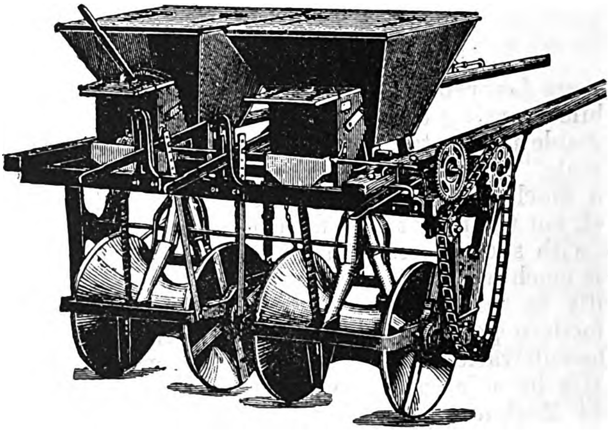

FIG. 27.—Turnip ridger, made in New Zealand.

The ridges are raised by means of revolving disks, and with concave rollers the drills are rolled in the center. These rollers have a seed pressure ring in the center.

These machines are most carefully constructed and possess all the features found on high-class grain drills and similar machines.

TURNIP THINNERS.

The turnip thinners are so designed that two rows of turnips will be thinned at one time. They are fitted with depth-regulating wheels, which run at the side of the drills and readily adapt themselves to any inequality of the drill, taking out the "gap" more or less deeply as desired, leaving the bunch perfectly safe and easily finished by hand afterwards. They are constructed to conform to the drill made by the ridging machine that has preceded them. They are not used so often, however, as the latter machines, thinning being still largely done by hand.

The action of the hoes across the drills is on a horizontal plane. They come onto the drill with a keen cutting yet gentle movement, without crashing through the drill and carrying everything before them. After passing through the drills the hoes rise and pass over the plants. Their action is a close imitation of hand hoeing. Where there are blanks the hoes can be allowed to miss such.

TURNIP CULTIVATORS.

Usually the turnip cultivators are two-row machines similar to the American two-row corn cultivators. They have hoe steels next to the plants and sweeps for the bottom of the drills.

Turnips are usually cultivated two or three times, and such shovels and points as will do the most effective work in each case are supplied with the machines.

Two-row scufflers and cultivators with foot guide to clean the land between the rows of root crops are extensively sold.

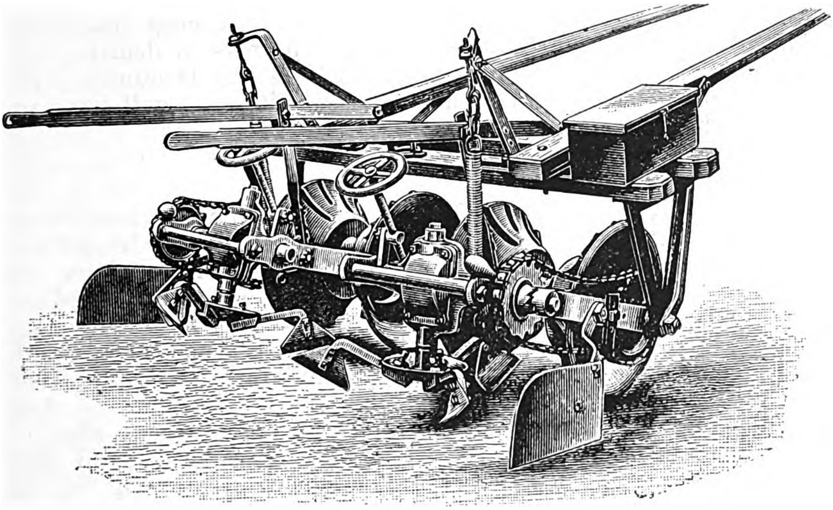

Fig. 28.—Turnip thinner, made in New Zealand.

TURNIP AND MANGOLD CUTTERS.

To cut turnips and mangolds on the ground (that is, for the cutting of the plants themselves without first digging them) a machine has been devised consisting of a rotating spider or cylinder that has four steel blades, attached to projecting arms, sharpened on the outside edge, and fitted behind the edge with projecting steel blades. The effect is that the steel blades slit the roots about 1¼ inches deep at intervals of 1 inch, and the following cutting edge shears off about 1 inch of the part that is slit. In some respects the work of these machines resembles that of cornstalk cutters.

BINDERS AND REAPERS.

The value of the binders annually required in New Zealand may be set at $100,000. Both right and left hand binders are sold, and owing to the heavy crops of grain to be harvested in that country it is important that the machines should be sufficiently strong to stand severe work. The reel in particular must be heavily reinforced. The 6-foot binder is the size most widely sold, although 5 and 7 foot binders are also sold in large numbers.

The trade in binders is entirely in the hands of American and Canadian manufacturers. Two of the leading manufacturers in these countries maintain their own branches in New Zealand and do the bulk of the business.

Reapers are in rather small demand. The machines as usually manufactured in the United States are satisfactory for New Zealand, although the question of proper strength is as important as in the case of binders.

CORN BINDERS.

A very few corn binders have been sold in New Zealand. They may lead to a greater interest in corn growing. One of the principal obstacles to increasing the area under that crop has been the difficulty of obtaining sufficient labor. The present demand for corn binders is very small indeed, and before the Dominion will attain any importance in this connection the situation will have to be greatly altered.

MOWERS.

In normal years about 1,000 mowers are imported into New Zealand from the United States, Canada, and the United Kingdom. The two first-named countries have by far the largest share of the trade. Wide frame machines with wide wheels are preferred to the usual type. The cutter bar must also be strong, as heavy crops of grass are often cut. Machines substantially constructed will always make a better appeal to New Zealand farmers. The sizes chiefly sold are 4½ and 5 foot machines, although there is also a good demand for 3½-foot mowers for one horse. Reaper attachments are occasionally required. The New Zealand demand for all sorts of haymaking machinery is undoubtedly increasing.

RAKES, TEDDERS, AND HAY LOADERS.

Both self-dump and hand-dump rakes are sold in New Zealand in good numbers. The sizes most in demand are 8 and 9 feet, with 24 and 28½ inch teeth, or heavier teeth.

A number of tedders are sold in New Zealand. The demand at present is not great, but considering the attention given to hay and grass growing it is reasonable to look forward to an increasing business in this line. Manufacturers would be justified in making proper efforts to popularize the use of tedders in New Zealand.

Sweep rakes and hay loaders are obtaining increasing favor. In these lines, much more than in the case of steel rakes and tedders, it is to be expected that local manufacturers will enter the field as soon as the demand is large enough.

HAY AND WOOL PRESSES.

Very few hay presses are sold in New Zealand at present, but the growing interest in supplementing the pasturage with hay and forage crops will doubtless lead to a greater business in this line.

There is a large demand for wool presses, but local manufacturers have designed machines of this type to meet local requirements most effectively and it is doubtful whether any efforts to sell imported wool presses would meet with success. A few New Zealand wool presses are exported to South America, South Africa, and Australia.

GRASS STRIPPERS.

To harvest grass-seed grass, strippers are sold in fairly large numbers in New Zealand. These machines are usually made to strip a width of 5 feet 6 inches. They are mounted on steel wheels, and strip the seed by means of a fast revolving drum placed underneath the machine and so constructed that its motion will lift all the shaken seed from the ground. All the machines used are of local manufacture.

TRASHING MACHINES.

While a fairly large number of thrashers are sold in New Zealand every year, the statistics of imports given on page 173 indicate that the entire demand can be said to be supplied by New Zealand manufacturers. In general their construction follows the lines of English machines. The bulk of the demand is for large contractors' machines that will thrash all kinds of grain and grass seeds as well as thrash and shell clover when equipped with the necessary special attachments.

Thrashers for small farmers located outside the reach of itinerant machines are also sold in small numbers.

Seed cleaners are sold in fairly large numbers, but here again the trade is supplied with locally made machines.

STEAM ENGINES.

A few steam engines for the operation of thrashing machines and sawmills are sold in New Zealand. The trade is largely in the hands of English manufacturers, their heavier and better-finished machines being much preferred. In recent years gas engines have largely supplanted steam engines for that work.

American manufacturers work under the handicap of the 10 per cent preference in customs duty given to Great Britain, and it can not be recommended that they make expensive efforts to secure a portion of this business, even if New Zealand depends entirely on imported goods of this kind.

GAS ENGINES.

Gas engines (other than for motor cars, cycles, and flying machines) to the number of 1,687, valued at about $290,000, were imported into New Zealand in 1915. The value of those supplied by the United States was about $72,000. These figures include engines for both agricultural and industrial purposes.

Many hundreds of engines of from 2½ to 4 horsepower are now sold in New Zealand every year in connection with milking and sheep-shearing machines. In arranging for the sale of gas engines manufacturers should, as a rule, prefer such firms as can offer to their trade milking and sheep-shearing machines, since gas engines are very largely bought in connection with these.

Cheaply constructed engines had a good sale for some time, but their popularity rapidly waned when they failed to stand up properly under use. For some time, when a farmer bought a milking or shearing power outfit he paid little attention to the quality of the engine, his chief concern being to buy the best milking and shearing machine. Some of the engines thus bought have given very unsatisfactory results, and the situation in this connection has now considerably changed. New Zealand farmers, on the whole, have always shown a great dislike for cheap and poorly built machines. The manufacturers who seek a permanent trade in gas engines in that country should offer the very best they can produce.

In spite of a duty of 20 per cent paid by American engines as against only 10 per cent for British-built machines, several American manufacturers are doing an increasing business. The market, while of relatively restricted scope, deserves careful attention and interest.

In one or two cases New Zealand manufacturers have undertaken the construction, or rather the assembling, of gas engines, but it is not expected that their competition will prove serious for some years to come.

TRACTORS.

The shortage of labor due to the war has had the immediate effect of turning the attention of a great many New Zealand farmers to the matter of using tractors for agricultural work. Thus a demand has been opened up that is likely to continue and increase after present conditions cease to exist. During 1916 and 1917 the imports of tractors assumed very gratifying proportions, and a few American manufacturers made several heavy shipments to the Dominion during that time. Lately these have been partly checked because of the scarcity of tonnage and the high cost of freight.

While it will always be necessary to regard the high cost of fuel as a deterring factor, New Zealand can be considered a most promising field for the sale of small tractors. The labor situation, combined with the general prosperity of the farming community, will undoubtedly make that country a field deserving of the utmost attention on the part of American manufacturers.

Much of what is said in the writer's Australian report on the subject of tractors (see p. 118) applies to New Zealand. The question of price will generally be regarded as of secondary importance. Machines carefully built of good materials, and thoroughly dependable, will always be preferred by New Zealand farmers, even if they have to pay much higher prices than for roughly and cheaply constructed machines.

While agricultural operations are seldom conducted on a vast scale, tractors smaller than 10 horsepower at the drawbar will generally be regarded as unsuitable.

CORN SHELLERS.

The acreage under corn is very small, little corn is grown for grain purposes, and therefore the demand for corn shellers is limited to a few small one-hole machines for hand power with a capacity of 125 bushels per day, and to a few two-hole shellers for combined hand and motor power. American manufacturers supply the few machines the country requires.

SILOS AND ENSILAGE CUTTERS.

The demand for silos and ensilage cutters is at present very small, but the situation seems about to undergo a pronounced change. The question of ensilage making is one that is widely discussed as very important to insure the complete success of pastoral and dairying operations in New Zealand. Once ensilage is made in a district the practice extends from season to season.

Most of the silos to be seen at present are of the so-called stack type. These are formed by a framework of upright poles 4 feet apart braced together lengthwise and across with poles. Settling is obtained by placing wires over the stack and attaching weights to the ends. When the stack is complete soil is placed to give deadweight pressure. Undoubtedly, better silos will be constructed in the future, but in all probability the local manufacturers will supply these.

A few American ensilage cutters (mostly with two 11-inch knives), some equipped with blower attachment, are sold in New Zealand every year.

FEED GRINDERS.

For grinding grain for cattle feeding a good number of power grinders are sold. They are supplied with reversible grinding plates 8, 10½, and 13 inches in diameter, the smallest size having a grinding capacity of 125 pounds per hour and the largest 1,200 pounds per hour. The kibbling capacity is 460 and 1,800 pounds, respectively. These are chiefly sold to small millers and milling contractors. The trade is divided among American and English manufacturers.

A few small hand-power grinders are also sold.

CHAFF CUTTERS.

Large contractors' chaff cutters are manufactured by several New Zealand firms. The latter have been very successful in turning out most excellent machines, and a considerable number of them are exported to Australia every year.

Chaff making is a much more important industry in New Zealand and Australia than in the United States, and it may be safely stated that the manufacturers of these countries produce types far more efficient than the United States could offer them.

Small chaff cutters for combined hand and motor power, of the flywheel type, are also in demand and manufactured in New Zealand.

TURNIP AND ROOT CUTTERS.

Single and double action cutters for cutting finger pieces for sheep or for slicing for cattle are in good demand in New Zealand, the local manufacturers doing most of the business. These are convertible into pulpers, strippers, slicers, graters, and fingerers.

WAGONS.

While a few imported wagons are sold in New Zealand, the bulk of the demand is supplied by local makers.

The most popular type of wagon in New Zealand is made on the following specifications: Inside length of body, 11 feet; width of body, 4 feet; height of sides, 24 inches; rear wheels, 5 feet in diameter, with 2¾ by ⅞ inch tires; front wheels, 4 feet 3 inches in diameter, with 2¾ by ⅞ inch tires; axle, 2¾ inches. They are supplied with high spring seat, shoe brake, two pairs of shafts, and drawrods to suit four horses.

Farm drays are made both plain and spring mounted.

There is a possibility of selling some steel trucks in New Zealand with 26-inch front and 34-inch rear wheels and 2-inch axles.

WINDMILLS AND PUMPS.

There is a fairly large demand for windmills in New Zealand. Owing to the prevalence of rather strong winds during certain seasons of the year, substantial construction is an important requirement.

The sizes sold range from 4 to 12 foot wheels. Only occasionally are larger mills in demand. Both single and double gear mills are sold. The trade is largely in the hands of American manufacturers. Their only competitors are local makers, who in recent years have turned out windmills in fairly large numbers.

For pumping water at 120 feet and over, 18-foot up to 34-foot towers, three or four posts, are sold, whereas for bores under 120 feet 12-foot up to 20-foot tripods are often used. In localties subject to very high winds heavy wooden towers made in New Zealand are supplied as a rule.

Small wheel windmills are direct-acting mills with 4 and 6 inch strokes. For the larger mills 4, 6, and 8 inch strokes are used. Mills are generally sold and rated for 15-mile winds.

A good many automatic regulators to put windmills out of gear when the tank is full and to throw them into gear when the water in the tank reaches a certain point are sold with windmills.

A great variety of pumps is sold in New Zealand, the United States supplying most of the requirements.

SPRAYING MACHINERY.

Considerable progress has been made in New Zealand in recent years in the growing of fruit. The time is undoubtedly at hand when American manufacturers of spraying machinery should enter the market. The demand will be for both hand and power outfits.

CREAM SEPARATORS.

The value of the cream separators imported into New Zealand can be given at about $200,000 per annum. Sweden has about three-fourths of this trade. American manufacturers have made relatively good progress in recent years, and it is felt that if they continue their efforts they will substantially increase their business in the Dominion in the next few years. Certain American makes are beginning to enjoy a good reputation in that country.

The demand is for a great range of types and sizes, so much so that it would be difficult to indicate which have the preference. It should be remarked, however, that New Zealand dairymen are most thorough and discriminating in their selection of cream separators and that only the best in this line will appeal to them.

MILKING MACHINES.

New Zealand can doubtless claim that milking by machinery is carried on to a greater extent than in any other country. The difficulty of obtaining sufficient labor has been one of the main factors leading to this development. The farmers of the Dominion have displayed remarkable inventive genius and ingenuity in the adaptation and development of new ideas and improvements in milking machines. As a result there have sprung up a very large number of factories that turn out most excellent, practical machines—such as, perhaps, are unexcelled anywhere. From these remarks it will be obvious that a very brisk demand already exists in New Zealand for these machines; indeed, the majority of dairymen do their milking with machines. It will also be understood that there are no immediate prospects for the sale of American milking machines in that market. The advantage of the local manufacturers being continuously on the spot, together with the very satisfactory product they turn out, would make it extremely difficult for American manufacturers to make any inroads on their business.

Two, three, and four cow machines operated by 1½ horsepower gas engines, and 5, 6, and 8 cow machines operated by 3½ or 4½ horsepower engines, are the sizes most in demand. Some milking outfits are so complete in every detail that the milk is carried from the cow's teats to the separator.

Generally very long terms of payment are given to purchasers of milking machines. Two-year installments are rather common.

SHEEP-SHEARING MACHINES.

The importance of sheep raising in New Zealand will indicate at once that the country offers most excellent prospects for the sale of sheep-shearing machines. There are no machines of this type made in New Zealand. The demand is supplied with American and English machines.

HORSE GEARS.

There is a considerable demand for horse gears in New Zealand, which is supplied almost entirely by local manufacturers.

SAW BENCHES.

A good many saw benches are sold in New Zealand. Several local firms manufacture these, but it is not improbable that American manufacturers can find a market for their goods in that country, if they make adequate efforts.

The most popular sizes have saws 20, 24, 28, 32, and 38 inches in diameter.

VII. TRADE METHODS AND SUGGESTIONS.

With regard to New Zealand commercial practices and the proper course of action to be pursued by American exporters, the following excellent suggestions may be quoted from a circular prepared by United States Consul General Alfred A. Winslow, who is stationed at Auckland:

CREDITS AND TERMS OF PAYMENT.

As a rule the business men of New Zealand are honest, conservative, and reliable. Should an exporter wish special information it can be obtained of the New York agents representing the New Zealand banks mentioned in a subsequent paragraph, or of R. G. Dun & Co., who have a branch office in Auckland. Merchants in general have been accustomed to buy either for cash against documents at port of delivery or on time ranging from 30 to 90 days after receipt of goods, and do not take kindly to the pay-cash-against-documents-at-port-of-shipment plan of so many American firms. If American manufacturers and exporters expect to get and hold a portion of this growing business they must put themselves in position to grant better credit terms. This means much to the business interests in New Zealand, and, other things being equal, they are certain to go where satisfactory credit is extended. A manufacturer who demands cash in full at the port of shipment should not expect much business in New Zealand.

TERMS OF PRICE QUOTATIONS.

In quoting prices manufacturers and exporters should give prices c. i. f. New Zealand port, whenever possible, and never less than f. o. b. steamer at port of shipment, for the purchaser is not in a position to find out costs to port of shipment and loading charges as can the shipper, and then American exporters should do all they can to assist the foreign purchaser. These are important matters, since a large proportion of the imports is distributed from the docks to save warehouse charges, and the importer must know as nearly as possible the cost price at New Zealand port.

BANKING FACILITIES.

The banking facilities between the United States and New Zealand are far short of those between England and the Dominion, but they are improving and should be quite sufficient to handle the increasing trade. Following is a list of the more important banks in Auckland doing a foreign-exchange business: National Bank of New Zealand (American agents, Canadian Bank of Commerce and Bank of British North America, New York City); Union Bank of Australia (American agents, Canadian Bank of Commerce, International Banking Corporation, and Brown Bros. & Co., New York City); Commercial Bank (American agents, Irving National Bank and National City Bank of New York, New York City); Bank of New Zealand (American agents, Canadian Bank of Commerce, J. P. Morgan & Co., and Bank of British North America, New York City); Bank of New South Wales (American agents, Standard Bank of South Africa, Ltd., New York City); and Bank of Australasia (American agents, International Banking Corporation, New York City).

TARIFF PROVISIONS.

The United Kingdom and possessions enjoy preferential duty on 193 items out of a total of 483, consisting principally of luxuries and articles manufactured, or that might be manufactured, in New Zealand. The extent of the preference ranges from 4 per cent on a few small items to 10 per cent on such important items as provisions, drugs and chemicals, manufactures of leather, china and glass ware, fancy goods, musical instruments, firearms, hardware, and many manufactures of iron or steel and the more important lines of machinery;

to 12½ per cent on preserved fruits and milk, furniture, plate glass, stationery, tinware; to 20 per cent on cardboard, print paper, iron boiler plates, iron pipes, iron plates, iron or steel cable; and even to 25 per cent in a very few cases; while the nonpreferential lines are fresh fruits, tobacco and cigars, spirits, clothing and textiles, leather, oils, fertilizers, etc. Tariff rates on specific articles can be had from the Bureau of Foreign and Domestic Commerce, Department of Commerce, Washington, D. C., or from the Auckland consulate general. Until some months after the close of the European war the preferential duty in favor of the United Kingdom will have little effect on shipments from that country, for the reason that manufacturers are unable to fill orders in many lines; so this is an opportune time for American interests to get a foothold that may be profitable and lasting.

COMMERCIAL TRAVELERS.

Only first-class commercial travelers with Anglo-Saxon names, familiar with foreign manners and customs, should be sent to this field—such as succeed at home, for conditions are much the same in New Zealand, except that it is British territory and sympathies are strongly with the mother country at this time. Commercial travelers are required to deposit with the customs officers at the port of entry the amount necessary to cover the duty due on their samples, and the further sum of £10 ($48.66) on account of revenue tax on income. Corporate bodies are required to pay 5 per cent and private parties 2½ per cent on their net profits, which must not be less than 5 per cent of the invoice cost of the goods sold in the country. On leaving the country they receive the amount deposited for duty upon proof of the reexportation of the samples, less the amount deducted for income tax as per schedule of sales made in the Dominion.

"DON'TS" TO BE CAREFULLY NOTED.

Don't fail to pay full postage, which means 5 cents for each letter weighing 1 ounce, and 3 cents for each additional ounce. Don't expect to secure much New Zealand trade without a strong effort. Don't send your customer something different from what was ordered, simply because you happen to think it is as good or better. Don't fail to mark your cases very clearly on top, one side, and one end with characters at least 2½ inches high. Don't fail to pack everything well. Don't look for immediate results; be willing to work and wait.

NOTE.—In connection with the foregoing report, Commercial Agent Homs submitted a list of New Zealand importers of agricultural implements and machinery. Interested persons may obtain this list from the Bureau of Foreign and Domestic Commerce or its district or cooperative offices by referring to file No. 1378.

RECENT PUBLICATIONS ON AGRICULTURAL IMPLEMENTS AND MACHINERY.

The Bureau of Foreign and Domestic Commerce has recently issued the following monographs on foreign markets for agricultural implements and machinery, which may be obtained for the stated prices from the district offices of the Bureau or from the Superintendent of Documents, Government Printing Office, Washington, D. C.:

Markets for Agricultural Implements and Machinery in Argentina, by Frank H. von Motz. Special agents series No. 125; 1916; 86 pages; price, 10 cents.

Markets for Agricultural Implements and Machinery in Brazil, by Frank H. von Motz. Special agents series No. 140; 1917; 59 pages; price, 10 cents.

Markets for Agricultural Implements and Machinery in Chile and Peru, by Frank H. von Motz. Special agents series No. 142; 1917; 48 pages; price, 5 cents.

Markets for Agricultural Implements and Machinery in South Africa, by Juan Homs. Special agents series No. 146; 1917; 231 pages; price, 20 cents.

East African Markets for Hardware and Agricultural Implements, by Consul Henry P. Starrett. Special consular reports No. 78; 1917; 27 pages; price, 5 cents.

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DEPARTMENT OF COMMERCE
BUREAU OF FOREIGN AND DOMESTIC COMMERCE
B. S. CUTLER, Chief

SPECIAL AGENTS SERIES—No. 167

ELECTRICAL GOODS IN BOLIVIA AND CHILE

BY

PHILIP S. SMITH
Special Agent

PRICE, 20 CENTS
Sold by the Superintendent of Documents, Government Printing Office
Washington, D. C.

WASHINGTON
GOVERNMENT PRINTING OFFICE
1918

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LETTER OF SUBMITTAL.

Department of Commerce,
Bureau of Foreign and Domestic Commerce,
Washington, May 6, 1918.

Sir: There is submitted herewith a report by Special Agent Philip S. Smith on the market for electrical goods in Bolivia and Chile. Germany, which held nearly half of the total Bolivian trade in electrical goods in 1913, has been practically eliminated from the market for the time being, and as a consequence the share of the United States rose from less than 1 per cent in 1913 to 43 per cent in 1915. There was an increase from 8 to 32 per cent between 1913 and 1915 in the American share of the Chilean imports of electrical goods, but the strength of Germany's hold on the Chilean market is shown by the fact that even in 1915 it furnished more electrical goods to Chile than did the United States. Orders for German goods have followed the investment of German capital in Chile. This country is regarded as a promising field for power, transportation, and manufacturing development and therefore as an excellent potential market for electrical equipment of all kinds. If American capital responds to this opportunity, American supplies will follow.

Respectfully,

B. S. Cutler,
Chief of Bureau.

To Hon. William C. Redfield,
Secretary of Commerce.

ELECTRICAL GOODS IN BOLIVIA AND CHILE.

BOLIVIA.

INTRODUCTION.

The Republic of Bolivia lies practically at the center of the South American Continent and is bounded on all sides by other countries, having no outlet to either the Atlantic or the Pacific Ocean through its own territory. Its area has not been accurately determined, but it is estimated at 515,000 square miles. There is no exact knowledge concerning the population, but it is generally estimated to number 2,000,000 to 2,500,000. According to the latest official estimate, 16.1 per cent of the population are whites, 31.6 per cent are cholos, or mestizos, and 52.3 per cent are full-blooded Indians. The following table shows the political divisions of the country, with their area, population, and capitals and the population of the capitals as estimated in 1914, according to figures published in the Boletin de la Dirección General de Estadística y Estudios Geográficos:

Departments and Territories.	Area.	Population.	Capital.	Population of capital.
	Sq. miles.			
La Paz	40,000	633,000	La Paz	87,000
Cochabamba	25,000	466,000	Cochabamba	28,000
Potosi	45,000	462,000	Potosi	27,000
Santa Cruz	125,000	298,000	Santa Cruz	23,000
Chuquisaca	33,000	290,000	Sucre	27,000
Tarija	32,000	146,000	Tarija	9,000
Oruro	21,000	123,000	Oruro	20,000
El Beni	92,000	46,000	Trinidad	5,500
Delagación Nacional en el Oriente	27,000	14,000	Puerto Suarez	2,000
Colonial Territory of the Northwest	28,000	45,000	Riberalta	2,500
Colonial Territory of the Gran Chaco	47,000	12,000	Villa Montes	900
Total	515,000	2,535,000		

Prior to the war with Chile in 1879, Bolivia had access to the Pacific via Antofagasta, which is in territory that then belonged to Bolivia, but by the terms of peace this coast strip was lost, so that it is now bounded on the west by Peru and Chile, which extend as far inland as the first line of the Andes Mountains. To the north the forests of the rubber district join with those of Brazil in a frontier whose location is practically unknown. On the east the country falls away rapidly into rolling prairies having an altitude of little more than 400 meters (1 meter=3.28 feet) and is bounded by Brazil and Paraguay. On the south it still has an altitude of some 3,000 meters where it merges with the foothills of Argentina.

Geographically Bolivia may be divided into three zones. The first consists of the high tableland or "altiplanicie," which lies between the two main ranges of the Andes and has an average altitude of

3,800 meters above sea level. Some of the highest peaks of the Andes thrust themselves up from this tableland, reaching the great height of 7,600 meters. Owing to its elevation this region has a cold climate, the temperature sometimes falling 10 degrees Fahrenheit below zero. There are only two seasons and these are usually called summer and winter, the former being the rainy months, or November to April, and the latter the remaining months, when all is dry and gray and practically no vegetation flourishes. The rivers that drain this section are swollen torrents in the rainy season but dwindle to mere creeks or dry up entirely during the rest of the year. There are no lakes or reservoir basins to store the water for use during the dry season. To develop power from the streams of the altiplanicie it would be necessary to construct large artificial works to hold the floods of summer for winter use.

The chief mineral resources of Bolivia are located in the altiplanicie, both base and fine minerals being found in abundance. In the times of the early Spaniards it was from such places as Potosi that the almost incredible amounts of silver were extracted to fill the treasure vaults of Spain. Primitive methods were used and only the richest deposits of gold and silver were considered worthy of attention. Consequently only the surface of the ore-bearing regions was touched and copper, zinc, and tin were passed by unnoticed. To-day some of the largest profits in Bolivia are coming from mines that were filled up by the Spaniards with the refuse of their operations but that contain large proportions of tin mixed with silver, which modern methods recover to advantage.

The second geographical division, which may be called the Amazon region, covers an area of nearly 200,000 square miles and may be divided further into two zones, the mountains and the prairie. The former includes many of the small valleys of the feeder streams, which run northward, ultimately to discharge into the Amazon. The courses of these streams are interrupted by waterfalls and cascades that mean immense potential resources in hydroelectric power. Most of these rivers come from the melting snow of the eternally covered peaks and are augmented by the rains that occur throughout the year with considerable frequency and volume. These watercourses are always full, in contrast to the periodic dryness of the rivers of the altiplanicie. Descending from the mountainous zone there is a temperate strip with low and straggling vegetation joining the prairies and forests, rich in tropical flora and fauna and in possibilities for the production of rubber, coffee, cotton, and cacao. This stretches away into the Brazilian jungles and plains.

The third division is the southeastern part, which also contains mountains and pampa. The mountains, like those of the first division, are rich in minerals and are the chief source of Bolivian wealth. The lowland section, though more extensive than that of the Amazon region, covering some 120,000 square miles, is not so uniformly fertile and well-drained. During portions of the year large sections are completely arid, while at others they are converted into lagoons by the heavy rains. Nevertheless, a great proportion of these level lands are capable of producing tropical or semitropical crops and, with a well-regulated water supply, could be developed into a great stock-raising country. There is little chance that the few rivers available for hydroelectric power in the third geographical division will be made use of; the surrounding country is agricultural and the mines are too far away for the transportation of current to be worth while.

FOREIGN TRADE.

The general trade of Bolivia with the outside world is growing, although slowly, and is subject to severe fluctuations from year to year. One of the causes of this is the fact that the prosperity of the country depends almost wholly on the metal markets of the world, as the exports consist of little besides ore and minerals. In 1915 the exports amounted to $38,084,140 and of this minerals accounted for $32,485,602, or more than 85 per cent. The result of this preponderance of ore exports is a good year when the prices are up and a bad one when they are down; the whole country is affected, as there is nothing to act as a balance in markets that may be more stable than the Bolivian ore market. In the 10-year period beginning with 1906 the smallest total foreign trade was in 1907, the sum of exports and imports being $35,291,583, while the largest total trade was in 1913 and amounted to $59,383,738. The value of exports alone fluctuated during this period from a minimum of $19,570,246 in 1908 to a maximum of $38,084,140 in 1915. This year might easily have been the banner year for foreign trade had not the imports fallen to the lowest point in 10 years, being only two-thirds what they were in 1906. To this reduction the difficulties of transportation, the increased prices, and the curtailment of credit were all contributing factors. Practically all new work involving the purchase of machinery has been stopped until it may be possible to obtain it at lower prices. This has affected all engineering lines, especially mining and electrical development.

The following table shows the total imports and exports, by principal countries of origin and destination, for the last four years for which the figures are available. Conversions to United States currency were made at the rate of 40 cents to the boliviano; the exact equivalent is 38.93 cents.

Countries.	1912	1913	1914	1915
IMPORTS FROM—				
Germany	$6,605,452	$8,036,545	$4,250,120	$430,309
United Kingdom	3,627,806	4,440,507	3,123,504	1,453,675
Chile	1,592,902	2,223,789	2,194,917	1,349,294
United States	1,837,862	1,617,641	1,854,700	1,906,516
Peru	1,512,474	1,210,303	1,142,231	1,708,405
Argentina	1,211,667	1,319,727	1,021,935	590,348
Belgium	1,028,240	913,757	922,529	369,738
All other	2,387,193	2,142,864	1,394,553	1,221,541
Total	19,803,596	21,905,133	15,904,489	9,029,826
EXPORTS TO—				
United Kingdom	26,781,464	30,305,730	20,774,500	26,654,736
Germany	4,480,309	3,189,496	1,475,977	25,654
France	2,188,764	1,828,735	1,063,000	326,922
United States	156,898	223,790	981,000	10,007,239
Belgium	1,415,449	1,268,894	754,066	....
Chile	339,843	236,207	496,178	298,890
Peru	381,726	13,048	405,332	31,704
All other	304,742	422,705	370,405	738,995
Total	36,049,195	37,488,605	26,320,458	38,084,140

For the years previous to 1915 all electrical goods were included under one heading, but in that year they appeared under "Electrical machinery and apparatus; for illumination or generation of power" and "Electrical machinery and apparatus; for telegraphs." The following table shows the total imports of electrical goods into Bolivia, by principal countries of origin, in 1912, 1913, 1914, and 1915:

Countries.	1912	1913	1914	1915		
				Total.	Apparatus for illumination or power.	Telegraph apparatus.
Belgium	$32,729	$10,556	$7,461	$1,477	$1,136	$341
Chile	12,468	16,545	22,550	17,312	8,383	8,929
France	6,843	30,485	24,429	7,220	6,132	1,088
Germany	267,632	297,464	94,123	1,852	1,178	674
United Kingdom	12,607	200,349	42,047	6,343	5,489	854
United States	11,776	5,922	20,808	34,267	29,036	5,231
All other	5,283	50,701	6,060	10,483	2,850	7,633
Total	349,338	612,022	217,478	78,954	54,204	24,750

CENTRAL STATIONS.

All the central stations are of relatively small capacity, as there is only one city of over 30,000 inhabitants. Moreover, the Indians and cholos, who form a large proportion of the population, are very small consumers. They use not more than one or two lamps per family, and many are entirely without this modern convenience. Only three cities have a day circuit, Cochabamba, La Paz, and Potosi. Consequently there is only a lighting load in the other plants, and as all use the high-efficiency metallic-filament lamp, the present equipment is ample for the needs of the country for some time to come. Of the six cities with more than 20,000 inhabitants, five have electric plants, which range in capacity from 135 kilowatts in Oruro to 2,500 kilowatts in La Paz. Practically all the smaller towns that have current obtain it from the mines near which they are located.

Coal is selling at about $75 a ton, or about double its price in normal times. At either price it is practically prohibitive for industrial purposes, and for that reason the prime movers of the central stations are either Diesel engines or water wheels, if the plant is fortunate enough to be situated near a stream of sufficient size. Owing to the peculiar meteorological conditions of the highlands, little water power is available on the Pacific slope or on the great middle pampa section where most of the towns and mines are located. In fact, in Oruro and Potosi, the two chief mining centers, there is not enough water to be used in the concentration plants, which have therefore had to locate some distance from the mines themselves. In Potosi there is enough water during the rainy months, if all the concentration plants use the same water, but they have to practically shut down during the dry season. The electric plant is 6 kilometers (1 kilometer=0.621 mile) from the town and uses this same water after it has passed all the mines. The service has been quite unsatisfactory owing to scarcity of water at times and to the fact that the water is full of acids, which attack the piping and the wheels and make frequent repairs necessary. The rivers in this region are dependent for their water upon the drainage of the country through which they run. In times of rain they are flooded, becoming sometimes raging torrents, dangerous to all artificial structures in their course, while at other seasons they all but disappear. This condition is not true on the Atlantic slope, as there the more frequent rain and the melting of the snow on the mountains maintain a practically constant supply of water. The descent of the rivers is sufficiently rapid to permit the easy development of power, but they are located in a section of the country that is wholly undeveloped and likely to remain so for years to come.

LA PAZ.

The central station that furnishes current for the city of La Paz is the Bolivian General Enterprise Co., a French company whose machinery is from Schneider et Cie. It represents this house, which is a large factory interested not only in electrical machinery but also in general mechanical equipment, railway material, and artillery. The plant consists of hydroelectric generators at the main station outside the city and transformer and rotary substations for providing the current for the street cars and the residence and public lighting. The transformer stations are substantial brick structures located at different points throughout the city at the centers of distribution. They contain transformers and switching apparatus, and from them secondary feeders extend to the various low-tension circuits of the districts into which the city is divided. The transmission line and nearly all the poles in the city are of steel, usually made up of angles and flat cross pieces that give the towers a square section of about 18 inches at the base. The three-phase lines are painted at convenient intervals with colors to distinguish the different phases and thus aid in making connections and keeping the lines balanced. Current from this company is also carried about 6 kilometers down the valley to Obrajes. There is little chance to sell electrical devices in La Paz because the company does not make special rates or in other ways encourage the increased use of heating, cooking, or other current-consuming apparatus. It should be a good place to push such material, because fuel is expensive. Besides kerosene, which is little used, the fuels available are "yareta," a sort of fungus turf; "tola," a small shrub that appears much like a dwarf cedar; and "taquia" (llama dung), which is the most common. The cooking arrangements are crude. The "anafre," an iron or clay brazier of special form for the kitchen, is almost universally used. Heating devices could be more generally used, as the climate is always chilly. Among the natives there is a general belief that heated houses are unhealthful and they are accustomed to shiver and wrap themselves up in overcoats and shawls; but they are learning to appreciate the value of local heating, for which electrical devices are most suited. With the high rates charged by the company, however, and no assistance from it in pushing the sale of devices of this character, it will be hard to make headway.

COCHABAMBA.

The Cia. Luz y Fuerza Eléctrica Cochabamba (Cochabambo Electric Light & Power Co.) is a native company, practically all the capital having been raised in Cochabamba itself. The first installation was made in 1909 and consisted of two 150-kilowatt water-wheel generators at Chocaya, a town some 18 kilometers from Cochabamba. A Diesel-engine generator was also installed at the city substation to be used as a reserve unit. In the following year a loan of £300,000 ($1,460,000) was obtained in London, and with this money a new plant was erected at Incachaca, 50 kilometers from Cochabamba, consisting of three 330-kilovolt-ampere generators direct-coupled to water wheels having a working head of 195 meters. The current is transmitted at 30,000 volts to the substation in the city and from there is distributed to the various feeders. This company not only furnishes the lighting and power, but also has a tramway system in Cochabamba with extensions to Calacala, a near-by suburb; to Vinte, 18 kilometers distant; and to Arani, 60 kilometers distant. It has a concesssion for building from Arani to Tetera (90 kilometers) but has been unable to start work on account of the abnormal conditions regarding the delivery and prices of material. The time limit of the concession has been extended twice and probably will be again if necessary, to enable the company to make more favorable contracts than would be possible now. All the present equipment is of German manufacture.

POTOSI.

One electric company, Empresa de Luz y Fuerza Eléctrica, furnishes the power and light for Potosi and some of the smaller mines nearby. There is also a private company, which built the trolley system in the city. The equipment for the latter was bought in the United States but has never been put into regular service, owing to some difficulty between the owner and the municipality over an accident that occurred at the inauguration of the road. The generating apparatus is one 50-kilowatt dynamo and two semi-Diesel engines arranged to drive through belt connection. There are three cars, each capable of seating 16, having been remodeled in Potosi to suit the narrow streets and sharp curves.

The Empresa Luz y Fuerza Eléctrica has a hydroelectric installation about 6 kilometers from the city, using water that has previously served in several concentration plants, with the result that there are frequent shutdowns for renewals of parts eaten away by the acids and impurities in the water. The plant is now undergoing a thorough renovation and all parts of the piping and turbines affected by the water will be replaced by noncorrosive metal. This change should help to make the service more constant. The capacity of the plant is 500 kilowatts with an old engine-driven reserve unit in the city substation. Current is generated at 5,000 volts, three phase, fifty cycles, and is transmitted to the city at the same voltage. Transformers at the substation reduce it to 220 volts for distribution about the city. All material is of German make.

ORURO.

The central station in Oruro is the Central de Luz y Fuerza Eléctrica and is owned by Gustave Hinke,[a] formerly agent in Bolivia for Siemens-Schuckert, German electrical manufacturers. The plant is located in the center of town and consists of a 135-kilowatt direct-current 220/440-volt generator belt driven by a Diesel engine. All electrical material is of Siemens make. An old steam-engine driven set is still kept in reserve.

CHARGES FOR ELECTRIC CURRENT.

The rates charged for electric current are about the same in all towns. The following table shows the schedule of the Potosi plant:

Items.	Rates.
House lighting:	
Flat rate per month, for 1 lamp of—	
16 candlepower	$1.04
25 candlepower	1.60
32 candlepower	2.00
50 candlepower	3.00
100 candlepower	6.00
200 candlepower	11.20
500 candlepower	27.20
1,000 candlepower	52.00
Meter rate (lighting) per kilowatt hour—	
1-25 kilowatt hours	.32
51-75 kilowatt hours	.304
House lighting—Continued:	
Meter rate (lighting) per kilowatt hour—Continued—	
76-100 kilowatt hours	$0.288
100 or more kilowatt hours	.26
Power, per horsepower year, or users of—	
1 horsepower	140.00
1½ horsepower	138.00
2 horsepower	136.00
3 horsepower	132.00
4 horsepower	124.00
6 horsepower	120.00
8 horsepower	116.00
10 horsepower and up	112.00

There are motors of one-half and one-fourth horsepower, the charges for which are proportional to those for the single horsepower hour. The expenses of installation include the labor necessary to put in place the conductors and apparatus and the material used, such as wire, cord, fuses, switches, and insulators. The cost of connections varies from $3.20 to $12 each, according to the material employed, the style of the installation, the size of the house, etc. All material, such as lamps, fixtures, shades, meters, and sockets, is for the account of the customer.

LIGHTING.

HOUSES.

In towns having current it is estimated that 65 per cent of the houses are using electric lights. This figure is probably too high, however, considering that even in the towns a large proportion of the population consists of Indians, who are not only conservative regarding modern improvements but also ignorant and too poor to afford any but the most simple mode of living. In the better homes fixtures and chandeliers are being introduced with good lighting effects, but as yet the majority of the houses are lighted by single drop lamps in each room, sometimes with tin or porcelain shades but just as often without even these simple attachments. The prices of such accessories, all of which are imported, are relatively high, and when the customer can not see that they increase his light or in some other tangible manner give him value received for the money spent, he will not add to the cost of an already expensive installation. Kerosene lamps are largely used in the houses that have no electric lights and in the towns and country where no lights are available, but the candle furnishes light for the poorer inhabitants in all sections.

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[a] On the Enemy Trading List as corrected to Mar. 15, 1918.

CHURCHES.

Practically all the churches have installed electric lights and have either remodeled the old candle chandeliers or purchased new ones. Supplementary lights are also furnished by high-candlepower drop-lights, with or without reflecting shades. No attempt has been made at indirect lighting.

STORES.

The merchants, quick to realize the importance of good lights, have become the best customers of the central stations. Probably no store has failed to put in electric lights, although in many cases the lights consist of only one or two units suspended from the ceiling by drop cord. Even with the single units, however, there is plenty of light, as high-power lamps are used with some sort of reflectors to project the light downward. There are no indirect or semi-indirect fixtures but some attempt has been made so to place the lights in the larger stores that a reasonably good effect is produced and the light is more or less distributed where it will do the most good. There are no dealers or stores handling electrical goods that are capable of introducing fixtures of a specialized type. Consequently it is doubtful whether there is any chance of selling such fixtures in Bolivia. Moreover, few stores could use them to advantage, because usually a good part of the stock is hanging from the ceiling. Many of the stores are only the front part of a room in the back of which live the owner and his family; but there is hardly any store so small that it has not at least one 16-candlepower lamp. These pay a fixed rate per month and buy their lamps in case of renewal, in both instances the prices being sufficiently high for the station to make a profit.

SIGNS AND SHOW WINDOWS.

There are no electric signs and practically no show windows. Of course each store has one or more windows and goods are always displayed therein, but with few exceptions these displays are as large an assortment of the miscellaneous articles carried as can be crowded into the small space. A drop lamp is always installed to illuminate the goods, but beyond this there is nothing. In some cases high-power lamps are used, so that the cost of operation would be no greater with some of the modern fixtures designed for this special purpose. Since there is no one, however, to advise and assist in their installation, the merchants, who are neither posted on such matters nor in a position to find out about them, are content to continue with the present equipment mentioned, especially as none of their neighbors has anything better. It is not to be expected that Bolivia should offer a field for outfits that would be used in a fashionable store of some large city, but simpler fixtures for both windows and signs would be acceptable provided there were some one to instruct the Bolivians in their use and help in their installation.

PUBLIC LIGHTING.

One of the principal sources of revenue for central stations, particularly in the smaller cities, is a contract with the municipality for street and park lighting. At least, this formed the basis of their revenue when they were first established. As a result, all the cities have street lights that are usually adequate for the size of the place. In La Paz the central section is lighted with gas-filled lamps of high power, while the outlying districts are lighted by smaller units or by 40 and 60 watt metallic-filament lamps. All operate from low-tension, multiple circuits, which are run separate from the house-lighting circuits. In the other cities there are occasional high-power units, but the majority of the lighting is done with 40 and 60 watt lamps or even, on the less important streets, by 20-watt lamps. They are invariably 110 or 220 volt units and sometimes are run direct from the house circuits. All-night service is the rule regardless of the brightness of the moon, the lights being switched on half an hour after sunset and extinguished half an hour before sunrise. There is always a well-lighted open square or plaza in the center of the town and sometimes others at convenient points in the residence sections. These squares are the only places where ornamental standards are used. The lights are commonly suspended from wires stretched from house to house, where the narrow streets permit, or else on simple pipe brackets attached to the electric-light or telephone poles. In La Paz the light is frequently attached by a special insulated spring suspension to the outer end of the bracket arm that carries the trolley wire. This is particularly useful where there are no other poles in the street or where trees would interfere with other methods, and it seems to give perfectly satisfactory results.

FARM-LIGHTING SETS.

With few exceptions the farming is done by the Indians in the same way that it was done in the time of the Incas, and they refuse to consider any modern innovation. For lights they are satisfied with the candle and as they retire pretty soon after the sun few candles suffice for their needs. There are a few "chacras," or farms, near the railroads, owned by natives who are well-to-do, but the great farming country lies in the interior and as yet has been little developed. The best way to introduce farm-lighting sets would be to get in touch with the importing houses by sending catalogues and prices and by advertising in the magazines, in Spanish. A few of the magazines published in the United States reach the more prosperous people and the business houses.

LAMPS AND FIXTURES.

Only the metallic-filament lamps are used, except when some small house buys up a job lot of another kind and peddles them out to the public. The central stations would like to handle all this business. but they charge such high prices that small stores can buy lamps in small quantities and easily sell them for less than the lighting company. The result is that many different marks are to be found, and also lamps without any marks, but the majority are of European origin and of the well-known brands. Lower price, better handling by the agents, and supposedly longer life than American lamps have been responsible for the success of the European lamps in Bolivia. At least one company bought enough lamps in 1913 to last for several years; it still has in stock sufficient, at the present rate of sales, to last until the end of next year, if not longer. The 20, 40, and 60 watt and the 50, 75, and 100 watt gas-filled lamps seem to be the most popular. For street and park lighting and for stores, which hang them in front of the building as advertisements, the high-power lamps, up to 1,000 watts, are used.

As the usual lighting installation is a drop cord with a single bulb, there is only a small market for fixtures of any kind. Occasionally some one purchases a fancy chandelier for a hotel or a large residence, but the majority of these are bought from catalogues and not from stock carried by the lighting companies or dealers. The supply on hand covers a few comparatively simple designs, but not of the severely plain nor of the combination gas and electric types, as there is no gas. The country is not yet prepared to accept the semi-indirect, or even more advanced ideas in fixtures, and any solicitation of business other than a circularizing of the dealers with catalogues and descriptive matter would probably prove a waste of time and money.

HEATING AND COOKING DEVICES.

There is practically no provision in Bolivia for heating houses. The people are accustomed to a house temperature of about 50° in the cold season (June, July, and August) and believe that heated houses cause rheumatism and other troubles. A few persons, mostly foreigners, use oil stoves. Besides the native disinclination to have the houses heated, a serious drawback to the sale of current-consuming devices is the price of 32 cents per kilowatt hour. There is no disposition on the part of the central stations to reduce this rate for the purpose of encouraging the use of household devices. Three of the largest cities, La Paz, Potosi, and Cochabamba, have continuous current and in the first two places there should be some field for electrical heating devices. The weather is always warm in Cochabamba.

On account of the high rates charged and also the fact that the cooking is done by native servants, there is no demand for arrangements more convenient than those now in use and electric cooking apparatus is unknown. Practically all the food is prepared on the "anafre," a sort of brazier, using twigs, fungus, or llama dung for fuel. Coal is both scarce and expensive, kerosene is expensive and little used, and it is impossible to obtain a good grade of wood. It would seem that particularly in La Paz, where there is an abundance of water power, electricity would make an ideal substitute for other fuels, but in spite of the comparatively high prices and the inconveniences of the fuel now available, the expenses are so far below those of cooking by electricity that few would be willing to make the change. The electrical devices themselves would represent no small investment, with the present prices and freights. Electricity for cooking purposes might prove popular, especially in La Paz, if the central station could be induced to run the circuits necessary to take care of the additional load and perhaps make some reduction in its charges for current. The ranges would be the most popular, or perhaps the burners for kitchen service. Small table utensils would probably not find favor, as the mistress of the house does not care to do any work of this nature when she has numerous servants for the purpose.

POWER.

LACK OF INDUSTRIAL DEVELOPMENT.

Bolivia is not now an industrial country, nor is it likely that it ever will be. The essential primary materials, coal and iron, are lacking and since the great altitude makes the cost of importing them almost prohibitive, the prospects for development are not bright. Then, too, the sparseness of the population, which, even counting the illiterate Indians and cholos, amounts to less than five persons to the square mile, precludes any considerable activity in manufacturing. There is little or nothing to attract skilled or semiskilled laborers away from the mines and railroads and without them it is impossible to conduct any industry on a large scale. Capital also would be needed and would have to come from outside the country, as the natives who have it are not given to investing it in such enterprises.

Not including the small shops, such as shoemakers', carpenters', tailors', and blacksmiths', the industries of Bolivia consist of a few factories making cigarettes, candles, spaghetti, matches, soap, and chocolate; a well-equipped shoe factory using American machinery, and numerous breweries. In the eastern part of the country are sugar-cane and coffee plantations, but the preparation of the products is as yet only a hand industry. It will probably assume greater importance when transportation facilities have developed.

MINE POWER PLANTS AND THEIR EQUIPMENT.

A certain amount of power is used in the larger mines and in all the concentration plants and smelters. In some cases this power is purely mechanical, being furnished by water wheels through rope drives, but in the majority of cases there is also an electric installation operated by Diesel engines. These stations are located at each mine and usually consist of two or more units to make them more flexible in operation, with an additional one for reserve. The fuel is imported, as none is to be had from local sources. Large deposits of petroleum are reported in the Santa Cruz district. They have been investigated but nothing has been done toward their exploitation. If they prove to be of value, they will constitute a supply near the point of consumption, which will result in the more general use of petroleum for power-producing purposes.

Most of the machinery imported into Bolivia is intended for mining or closely related purposes. The principal types are crushers of all kinds, crushing rolls, stamp, tube, and ball mills, pulverizers, revolving furnaces, separating tables, jigs, and magnetic separators. All these require power and together with hoists, pumps, and ventilating fans, form the main field for the application of electric motors. In nearly all cases the machines are grouped conveniently and driven by one large motor instead of by individual motors. Most of the mines are worked by hand labor only and the output is sold to larger mines that have equipment for its concentration. It is these larger plants that produce most of the output of metal and in them that the machinery and motors are used. Three of the plants employ 2,000 horsepower each, one employs 1,500 horsepower; two, 1,000 horsepower each; one, 700 horsepower; and two, 500 horsepower each. Besides these, 14 plants average 200 horsepower each and there are still others with 50 or more horsepower. Not all of these have electric power as yet. Some of the mines are not working and others will cease to do so when the prices of metals fall to pre-war level. Water in the mine, lack of water for concentration purposes, or the running out of the ore has raised the cost of production to a figure that makes the mine unprofitable to work. The demand is not so great, therefore, as it was a few years ago when the mines were making the installations; a fair amount of business will be done each year, but it is doubtful whether this will be of much value unless American or other foreign capital is invested, either to buy existing mines or to develop new property. Several such deals have been started recently and at least one of them has gone through successfully. An American company has taken over the interests of the Austral Bolivia (Ltd.), near Potosi, and will start dredging operations early in 1918 with machinery purchased in the United States. Much of the machinery for the mines is bought from local importers, but the larger mining concerns have their own offices through which they purchase direct from the manufacturer.

ELECTRIC SMELTING.

A new industry started in La Paz is the smelting of tin by electricity. An American company has established one furnace to smelt the "barrilla," or concentrated ore, using power purchased from the central station. Even with the high price that the company is obliged to pay for the current, the results are encouraging and other furnaces will undoubtedly be installed in the near future closer to the source of barrilla and power in order to lower the cost of production. On account of the scarcity and poor quality of fuel, a much more extensive use of electricity may be expected provided it can be developed in sufficient quantities. In the proposed hydroelectric scheme mentioned on page 21 some 30,000 horsepower would be available at a very low rate. The current consumed by a battery of smelters would furnish a basic load for the generating plant and leave a quantity of power to be sold at a profit for other purposes.

A small electric steel smelter has just started in La Paz. The owner is a German, resident in Bolivia for some years. He intends to make at first only balls for use in the crushers and ore mills. His raw material is wolfram and old iron, purchased wherever found, usually from the Indians who bring it in a few pounds at a time. At the proper moment in the smelting process the wolfram is thrown in and the tungsten content, released, hardens the steel and makes it suitable for ball-mill and like purposes.

HYDROELECTRIC POWER AVAILABLE.

A study has been made of the suitability of the Rivers Blanco, Colorado, and de Chiuta as the site of a large hydroelectric scheme. The confluence of these rivers is about 120 kilometers from Oruro and 80 from the nearest railroad, which is at present Kilometer 40, or the point at which construction has been stopped, on the private railroad that is being built by Mr. Simon Patine from Machacamarca, on the Antofagasta & Bolivia Railway, to his mines at Uncia. The study of the rivers was made by an Austrian engineer for the owner of a concession to develop the power available at this spot and was published in 1915 under the title, "Estudio de la Fuerza Hidráulica de los Ríos Colorado, Blanco, y Río de Chiuta con Anteprevectos para la Instalación de Centrales Hidroelectricas" (Study of the Hydraulic Power of the Colorado, Blanco, and de Chiuta Rivers, with preliminary schemes regarding the installation of hydroelectric power plants). According to the author's estimate, it will be possible to develop over 51,000 horsepower, for which there would be a demand from the mines and the railroads. By the erection of some 220 kilometers of transmission line the current could be brought to 14 active mines, which, it is said, could use 6,000 horsepower, and to 6 mines that are not now working but would probably start up with cheap power available and would need 3,000 horsepower. These 9,000 horsepower would be furnished by the first of the two plants proposed, which would have a capacity of 20,317 horsepower. The second generating plant would develop 30,888 horsepower, regarding the sale of which the report says:

> Before going on with the work of this section, which naturally depends upon the execution of the first, the management of the company would have to insure the consumption of at least a part, if not all, of its output, assuring themselves of the adoption of electric traction by the railway companies or of the installation of electric smelters, which would bring many advantages to the mining industry. The installation of these smelters might be undertaken by the company itself or the sale of energy to others contracted for, in which case, considering the large consumption involved, the price of the kilowatt hour could be greatly reduced. The same thing would apply to the railway companies that might electrify their lines. I have not been able to obtain data regarding the amount of energy that would be needed by such companies but calculate that with the smelters that might be established they would consume about the total production of the second section.
>
> One of the things to which attention should be called is the permanency of this business, which is not comparable to any other. A mine, however rich, can become exhausted; a railway company is liable to deteriorate because of changes in traffic to other lines; any industry whatever has to resist all the vicissitudes of competition; but the consumption of power, while there remain mines in Bolivia, can only increase.

The bulletin contains many interesting data and tables regarding the probable cost of construction, profits to be derived from the sale of power, etc.

TRACTION.

RAILWAYS IN OPERATION.

There are in operation in Bolivia 1,650 kilometers of railway of which only 87 kilometers are operated by electricity. The present means of communication with other countries are adequate for Bolivia's needs for many years, even should there be a great development in productive activity. Three roads extend from La Paz to the Pacific coast and the traffic is taken care of with trains running one to three times a week. As the demand increases more trains can be put into service on all the roads.

The most important railroad for commercial purposes is the Antofagasta (Chile) & Bolivia Railway Co. (Ltd.), which runs from the port of Antofagasta in Chile to Oruro in Bolivia, a distance of 925 kilometers. At Oruro it connects with the Bolivia Railway, which runs to La Paz, a further 200 kilometers. The line reaches a height of 13,000 feet and passes through some of the finest Andean scenery. At the Alto de La Paz, a point on the pampa above the city, it is necessary to change trains again, as the last 9 kilometers down into the city are operated by electricity over the line of the Guaqui–La Paz Railway. A branch line from Viacha to the city of La Paz, 29 kilometers, is being constructed by the Antofagasta & Bolivia Railway Co. (Ltd.), over which steam trains will be run.

The second and much shorter route to the Pacific is over the line of the Ferrocarril de Arica a La Paz (Arica–La Paz Railway). This line starts at Arica, Chile, and runs direct to the Alto de La Paz, a distance of 439 kilometers, of which 233 kilometers are in Bolivia. There is a grade of 3 per cent nearly all the way to Central, 75 kilometers from Arica. At Central, which has an altitude of 4,921 feet, the cog-wheel section of 41 kilometers begins climbing a 6 per cent grade to Puquios. From here to Alto de La Paz, a distance of 280 kilometers, the trains reach a maximum altitude of 14,108 feet. The time over this road is 22 hours, slightly less than 4 of which are spent on the rack section. The time required for the ascent is practically the same as for the descent when the machinery is in good condition. Studies have been made looking to the electrification of the rack section, but no action has been taken on the matter. Water power is available not far below the line, and it is believed that with comparatively little expense for dams sufficient reservoirs could be constructed to assure an ample supply of power at all times. The line is owned and operated by the Chilean Government and the administrador has his headquarters at Arica.

The third route reaches the Pacific at Mollendo, Peru. From the Alto de La Paz station to Guaqui, the Bolivian port on Lake Titicaca, the line is owned by the Peruvian Corporation, which also owns the line from Alto de La Paz down into La Paz, known as the Bajada Railway. On Lake Titicaca the Peruvian Corporation operates the boats that transport passengers and baggage to Puno, the Peruvian lake port where a transfer is made to the line of the Southern Railway of Peru, managed by the Peruvian Corporation. From Puno to Mollendo is 520 kilometers and from Guaqui to Alto de La Paz is 96. On the former section the highest point on the route is reached at Crucero Alto, 160 kilometers from Puno, the altitude being 14,688 feet.

In addition to these through lines there are three important branches of the Bolivia Railway, a company under the management of the Antofagasta & Bolivia Railway Co. (Ltd.). These are the line from Oruro to Cochabamba, which was inaugurated in the latter part of July, 1917; the line from Rio Mulato to the rich mining district of Potosi; and the line from Uyuni to Atocha. There are also three smaller lines owned by private companies. The one from Uyuni to Huanchaca, 38 kilometers long, is owned by the Cia. Huanchaca de Bolivia, a Chilean tin-mining company having its head offices at Valparaiso, Chile. This company was the original owner of the railroad from Antofagasta to Uyuni, which it constructed solely to bring down the ores from its mine. It was later sold to the present owner, the Antofagasta & Bolivia Railway Co. (Ltd.), but the sellers retained certain interests and rate concessions in the Uyuni–Antofagasta section.

The branch from Machacamarca, a station on the Antofagasta & Bolivia line, to Uncia is being built by Simon Patino to facilitate shipments to and from his mine. It will also be used by the Llallagua tin mines, which are located near Uncia and are owned by a Chilean company with headquarters in Santiago. Of this branch 40 kilometers have been finished and 64 remain to be done.

The third short road is owned by the Cia. Luz y Fuerza Eléctrica Cochabamba. With Cochabamba as a center it has lines running in three directions, all of which are electrified. In all there are 78 kilometers of road. One line extends to Vinto, 18 kilometers, and another to Arani, 68 kilometers. A branch also reaches Calacala, a village on the other side of the River Rocha. The rolling stock includes four electric locomotives and a number of trailers for first and second class passengers and for freight. The overhead work is ordinary trolley construction, cheaply built, and the rails are only 18 pounds to the yard. The locomotives are very small, with pantograph trolley. The power is generated at the Incachaca hydroelectric plant, which has three 333-kilovolt-ampere generators, 3-phase, 50-cycle. Current is transmitted the 50 kilometers at 30,000 volts to the substation at Cochabamba, where a rotary converter changes it into 550 volts, direct current. To furnish power in case of trouble with the line there is a Diesel engine generator at the substation. The company has a concession to extend its line to Totora, 90 kilometers from Arani, and the Government guarantees interest at 6 per cent on the loan that may be raised to construct it. All the electric equipment of this company is of German manufacture.

La Paz is situated at the foot of cliffs that descend almost perpendicularly 1,400 feet from the pampa above. In order to take its trains down this distance to the station in La Paz (called Challapampa), the Peruvian Corporation, which owns the Guaqui–La Paz Railroad, constructed and electrified a line known as the Bajada Railway, 9½ kilometers long, having a maximum grade of 7 per cent. The power station for this line is located a short distance from the La Paz station and consists of two 550-volt, 165-kilowatt, direct-current generators, each driven by a 400-horsepower Sulzer-Diesel engine, which, on account of the altitude, delivers a maximum of about 240 horsepower. There are also two 400-horsepower producer-gas engines, which formerly were the sole source of power, but which have been retired on account of the high cost of operation and are now held as spares only. Floating on the line there is a 1,200-ampere-hour Tudor accumulator, which acts as a buffer in absorbing heavy demands for power and which occasionally operates by itself to send up light trains. At this same place are the well-equipped car barns and machine shops, all of which are in charge of a resident English engineer.

The rolling stock was all purchased in the United States and consists of two 18-ton locomotives, which can operate coupled together or as single units, three tractors or motor cars, which both carry cargo and tow other cars, and four motor cars of the standard street-car type. These are used for taking special parties up and down whenever the occasion arises. The cars of the Guaqui–La Paz Railroad are taken from the Alto to the city by the locomotive or by one of the tractors, but the roads from Antofagasta and Arica run only as far as the Alto and there change passengers and freight to the Bajada line. At one time it was thought that the Guaqui–La Paz road would electrify its line to Viacha, 19 kilometers from the Alto, and haul all the traffic from that point to La Paz, but this project has been given up for the present.

RAILWAYS UNDER CONSTRUCTION.

One of the greatest problems facing the Government of Bolivia in connection with the development of the natural resources of the country is interior transportation. Social and commercial intercourse between the various political and geographical sections of the country is limited. There are practically no roads; cart or automobile traffic is possible only in the dry season, when the dry river beds take the place of roads. Practically everything intended for use away from one of the railway lines has to be transported on the backs of donkeys or llamas. The entire eastern part of the country is suitable for raising various crops, ranging from the purely tropical varieties to those grown in the temperate zones. There are also extensive pampa lands, which would make excellent pasturage for cattle if properly taken care of and watered. Owing to the lack of transportation, it is now much cheaper to import wheat, sugar, and similar products from Australia, Peru, and the United States than to bring them from the interior of Bolivia. Not only are the people dependent upon outside sources for their bread, but money is being taken out of the country instead of being attracted into it to exploit its resources. Moreover, without agricultural development the prosperity of the country is dependent on a fluctuating market for its metals.

That the Government has undertaken to solve this problem will be seen from the fact that there are three important lines under construction, in addition to the 29 kilometers of the Antofagasta & Bolivia Railway Co. from Viacha to La Paz and the 64-kilometer line to Uncia. The first is the extension of the railway from Potosi to Sucre, the nominal capital of the country (178 kilometers). This line is in charge of an American who has been engineer for the Bolivian Government for the last five years. The construction is being done by independent contractors, but the expense is borne by the Government. The second line will complete the railway from La Paz to Buenos Aires. It is divided into two sections; one is supposed to be built by the Bolivia Railway Co. and will run from Atocha to Tupiza (104 kilometers), and the other is let out to a firm of French contractors. At present the only work done on either section is 48 kilometers of roadbed, but work is continuing on the second section, and it is expected to begin on the first section within a year. This will form an important artery of travel, as it will give Bolivia an all-rail outlet to the Atlantic; the journey from La Paz will take less than five days, with only one change of cars to the broad-gauge line at Tucuman, Argentina.

The third line will run from La Paz to the Yungas, an agricultural region 125 kilometers distant. This road will have a maximum grade of 6 per cent and will reach an altitude of 15,100 feet. For this work a loan was secured from an American company. Owing to the stiff grades and the fact that water power is present in abundance very near the road, it is proposed to electrify the line. Few details of the plan are available.

PROJECTED RAILWAYS.

With the lines built or building and those studied or proposed, there will be a system reaching the heart of every district that most needs opening up and promises the quickest returns. Concessions have been granted or are pending for a line from Guayaramerin to Riberalta, known as the Madeira-Mamore Railway. Twenty-six kilometers have been constructed but have been seriously damaged by rains, with the result that work was stopped for some time. The total length will be 85 kilometers. From Cochabamba a concession has been given to the Empresa Luz y Fuerza Eléctrica to build its line from Arani, the present terminus, 90 kilometers farther to Totora. This line will be operated by electricity, as is the line from Cochabamba to Arani. The concession to build from the same city to Rio Isiboro (240 kilometers), and from some point on this line to Santa Cruz (300 kilometers), has been given to Simon Patino but nothing has been started on either of these lines. It is impossible to say whether electrification is intended because the plans have not been completed and the Government has extended the time in which they should be presented for approval.

Studies have already been made for the line from Santa Cruz to Puerto Suarez, with a branch to the Chimore, and next year (1918) a survey will be made to Santa Cruz either from Sucre or from Cochabamba. This will open up the section to the south of the La Paz–Yungas line, which will be extended to the Beni River in the vicinity of Rurrenbaque. At least some of these proposed roads will no doubt be operated by electricity, as they are located in the section where there is a continuous supply of water in the larger rivers. They are roads of the future, but will surely be built sooner or later, because the development of the country depends almost wholly upon the opening up of these fertile sections. The large and practically unproductive altiplanicie is the only part of Bolivia that is now accessible.

STREET RAILWAYS.

The Bolivian General Enterprise Co., a French concern, operates the central station and street railway in La Paz. It is claimed that the latter has never paid owing to the high cost of operating in comparison with the small number of passengers carried. Probably many more would ride if there were better service and lower fares. Standard-type cars are used except that a portion of them are divided into first and second class compartments on account of the large Indian population of La Paz. One single track runs from the Challapampa station through the main business streets to the other side of the city and a branch line extends about 2 kilometers to a small park on the hill beside the city. From the lower end of the main line, a single track runs to Obrajes, a town 7 kilometers from La Paz and about 1,000 feet farther down the valley. Cars run every 15 minutes in the city and every hour on the Obrajes line.

As previously stated, the electric railway in Potosi has never been put into regular service. The equipment, which came from the United States, operated perfectly for the short time that it ran. The cars proved too big, however, and have been rebuilt in the shops of the road to a size better adapted for the narrow streets and sharp corners. More powerful brakes have been fitted, also, as there are very steep grades in Potosi. The owner is a Bolivian and partial to American goods. The line is expected to be in operation soon, but at present (August, 1917) the only service offered to the public consists of one small car drawn by two mules.

ELECTRIFICATION OF STEAM ROADS.

Studies have been made on some of the roads now building to see whether it would prove profitable to equip them for electric operation and the result has been negative in almost every case. The saving would have to come from both lower cost of construction and cheaper operation. The only way of saving in construction would be to permit stiffer grade, but in a country so mountainous as Bolivia there is little chance to save on this score. In cost of operation the water power would be much cheaper than coal or oil, if only the cost of producing the current is counted, but if the proper charges for interest and amortization of the generation plant and overhead construction are included, there is no economy in operating by electricity. The traffic is very small, in some cases one train a week and at the most one per day. Such rates as would be necessary to cover the cost of operation would be prohibitive when divided over the small amount of freight carried. However, this is a subject worth studying, as the electrical business resulting would be large and unquestionably the money could be found to put the thing through if it could be proved feasible.

TELEPHONES AND TELEGRAPHS.

There are telephone systems in La Paz, Oruro, Cochabamba, Potosi, and Sucre. The instruments used in all these stations are of the local battery type, magneto-ringing, and except in La Paz, nearly all are made by Ericsson, a Swedish manufacturer. There are some made by Mix & Genest, of Germany, and a very few from the United States, bought in the last two years to fill in where it was impossible to get more from the original source. The instruments in La Paz are French, from the factory of Milde Fils & Cie., Paris. All circuits are carried by overhead wires and no cables are used except in one or two instances for entrance to the station. Iron wire, single-circuit, with ground return, is the universal custom. Service is never continuous throughout the 24 hours; it is usually available only from 8 a. m. to 10 p. m.

There are 350 subscribers in La Paz, 225 in Oruro, 256 in Cochabamba, 150 in Potosi, and 60 in Sucre. Some lines are as long as 60 kilometers, reaching some mine away from the center, but there is no established long-distance service connecting any of the towns. An opportunity exists to consolidate the stations under one company and link up the principal points with modern apparatus and methods. The business could be increased much more than would appear from seeing the numbers of subscribers under the present conditions. Scarcely a house has an instrument and the service is so miserable that one avoids telephoning, if possible. With good service and intelligent handling the public would soon look upon the telephone as a necessity instead of a nuisance. The rates are five bolivianos ($2) per month.

Among the mines are a number of local telephones, the largest single installation being that of the Aramayo Francke Mines (Ltd.). This company has a small board at its administration offices at Quechisla, from which lines run to 14 stations connecting the offices with the various mines and depots. The distances vary from 10 to over 100 kilometers for a single line. The administrator of this company is Mr. Malcolm Roberts, Quechisla.

The Government uses a number of instruments. On its telegraph lines it has stations at small places where it can not afford to keep a trained telegraph operator; consequently it has made them telephone stations. Messages are sent to the nearest telegraph office and then by telephone to the smaller stations, and in this manner a great saving in time and expense is effected over having to send them by messenger or having trained operators at each place. This department of the Government is under the Dirección General de Correos y Telégrafos, Ministerio de Gobierno y Fomento, La Paz.

The telegraph offices in Bolivia are operated by the Government, by the railroads, and by private companies. The Government lines are under the Dirección de Correos y Telégrafos, Ministerio de Gobierno y Fomento, La Paz, and consist of 7,000 kilometers of line, with 220 offices, of which 120 are equipped with telegraph instruments and 100 with telephones. The telephone offices are located in the unimportant towns along the line and act as feeders for the telegraph offices. In addition to the Government offices, there are 55 others, making a total of 275, not including the wireless stations. In all the telegraph offices the Morse system is used with sounding or recording instruments, and in 4 offices, Duplex instruments. The power is furnished by Leclanché or Barbier cells, and the wire of the transmission lines is No. 8 galvanized iron. In some towns there are two or more stations, as at La Paz, where there are offices of the Telégrafos del Estado (the Government line); Ferrocarril Guaqui a La Paz; and Cia. Telégrafos a Bolivia. This last is a private company having offices in La Paz, Viacha, and Corocoro, Bolivia, and Arica and Tacna, Chile.

In the sections where wood is available, it is used for poles; otherwise they are of round steel tubing known as the Mannesmann type, imported from Germany. In line with the Government's policy of opening up avenues of communication within the country, it is continually extending its telegraph lines and making repairs, both of which demand a certain amount of new material each year. It is estimated that during 1917 it will have to purchase goods to the value of $20,000, which will have to come from the United States. In normal times this material came mostly from Germany, where the prices were most advantageous.

As the country to the east is practically unexplored and it would be impossible to erect and maintain telegraph lines there, the Government has installed a number of wireless towers at the important centers. Both the Marconi and Telefunken systems are employed, the high-power stations being of the former and the low-power stations of the latter type. The Marconi stations are of 15 kilowatts' capacity and form the basis of the wireless network that has been laid out for ultimate construction. They are located at Capitandi, Cobija, Riberalta, Viacha, and Yacuiba. To supplement this service of the large stations, there are at present four Telefunken sets, with a capacity of three-tenths of a kilowatt, designed for a radius of 75 kilometers but having an actual maximum range of 350 kilometers. These are located at Ballivian, D'Orbigny, Esteros de Patino, and Yacuiba. Recently a secondhand set was purchased in Argentina for installation at Trinidad, and it is the intention of the Government to purchase sets in the near future for Baures, Puerto Suarez, Rurrenbaque, Santa Cruz, and other places in the interior.

The Viacha station is located within 30 kilometers of La Paz and was opened in the latter part of 1916. From it messages are sent to and received from all stations in Bolivia, as well as the San Cristobal station at Lima, Peru, and some of the Amazon stations of Brazil. The equipment is typical of the Marconi stations and consists of a gasoline engine driving a 15-kilowatt, single-phase, 500-volt, 200-cycle generator and direct-connected exciter; a 500-volt to 13,000/26,000-volt transformer; and 18 condenser tanks, each having a capacity of 0.072 microfarad. The wave length can be varied between 2,420 and 4,270 meters. The receiving and sending apparatus is contained in a specially constructed house near the base of one of the four steel towers, each of which is 84 meters high. Before it was completed, messages to the Riberalta district were sent from La Paz by wire to Cuzco and Lima and from there by wireless. This route can still be used in an emergency and there are thus two ways of communication between La Paz and the Bolivian interior at Riberalta.

The Riberalta is one of the most important stations, being in the rubber district, on the boundary of Bolivia, Peru, and Brazil, and located on one of the navigable branches of the Amazon. As yet it does not receive messages direct from the Capitandi station, but it is expected that this can be done later. Capitandi is the intermediary between Viacha (La Paz), the Pilcomayo, or central district of Bolivia, and Paraguay. Of the two stations at Yacuiba, the Telefunken is for exchange of messages with the Gran Chaco and the Marconi is for international messages between Riberalta and Viacha and stations in Argentina.

The purchase of wireless apparatus is under the care of the Dirección General de Correos y Telégrafos, Ministerio de Gobierno y Fomento, La Paz. It is not expecting to buy any large sets immediately but will put in several more small sets as soon as possible.

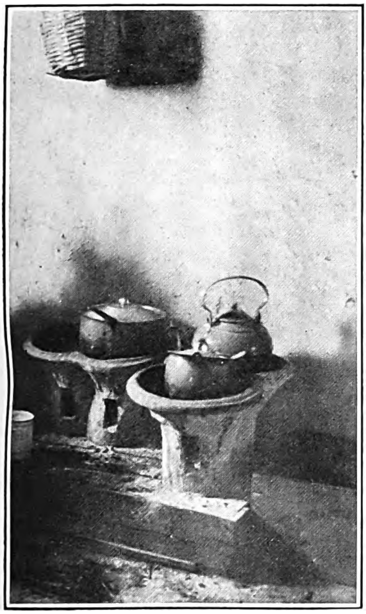

FIG. 6.—ORDINARY BOLIVIAN COOKING STOVE (ANAFRE).

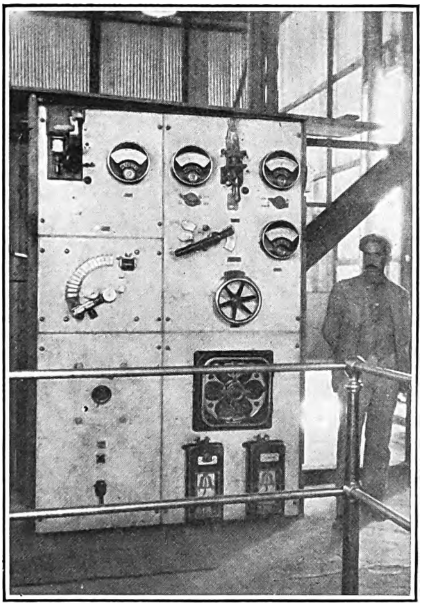

FIG. 7.—BAJADA RAILWAY, BATTERY CONTROL BOARD.

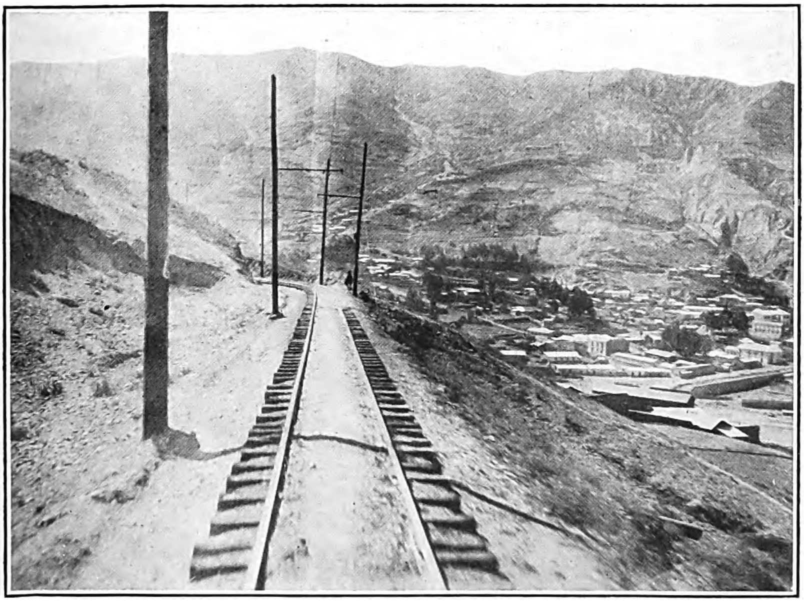

FIG. 8.—BAJADA RAILWAY, ALTO DE LA PAZ TO LA PAZ, A DESCENT OF 1,372 FEET IN 5 MILES.

The Telefunken, which is a German system, is not available now, and the Government is waiting to get it; but possibly another design would be acceptable if properly presented before the department.

It is thought that there are no amateur sets in use. The Bolivian youth is not mechanically inclined, and the schools give no training that would stimulate a desire to experiment with such things. The telegraph school, known as the Escuela Nacional de Telegrafía, which the Government maintains to train operators for its lines, may have some influence on the situation. This school was in La Paz until two years ago, when it was moved to Sucre. Last year it went to Cochabamba. Operators were needed in those districts, and it was difficult to get the students to go to La Paz. It is understood that a number took the course merely out of interest, possibly with the idea of following it up at home with their own installations. There is a magazine published in Spanish and devoted to the subject of amateur wireless, but it apparently has a small circulation in Bolivia. It is published by the Marconi Co., Marconi House, London.

MISCELLANEOUS EQUIPMENT.

BATTERIES—CONDUIT AND ACCESSORIES—METERS.

A small number of dry batteries is used for annunciators and door bells. It is the exception, rather than the rule, to find a house with a bell, and only the few hotels use annunciators. Wet cells are used by the railroads for some of their signals and for the telegraphs. Accumulators are found on all automobiles but nowhere else. The only large set is that of the Bajada Railway, a 1,200-ampere-hour battery, 550 volts, Tudor type, of English make.

Since no house-wiring regulations are in force, all installations are made as cheap as possible rather than with regard to appearance or safety. There is no fire hazard, as all buildings are made of brick, mud, or stone, and expensive installation work would be unnecessary. Conduit and its accessories, therefore, are not used.

All the central stations have some meter customers and they therefore are continually purchasing, although in very small lots. The meters should have cyclometer dial; this is used on the ones now installed, almost all of which are of German make. The standard form will be accepted now, but as the other is preferred such business would be only temporary, lasting until a supply becomes available from the former sources.

SCIENTIFIC DEVICES—TOOLS—TOYS.

The use of X-rays for any purpose and of electrical cabinets or other devices by physicians, surgeons, and dentists is practically nil. The hospitals have no devices of this kind either, and are prevented from purchasing them by lack of funds. The general attitude of the medical and dental profession seems to be one of conservatism toward the adoption of new equipment. Among the younger members, however, this conservatism is disappearing; they are being educated abroad or coming in contact with those who have been, especially with those who have been to the United States.

As there are few industries, there is little use of modern tools, except in the mines. Each mine and each railroad has its machine shops, but the tool equipment is kept down to the smallest possible investment. The blacksmiths, carpenters, and mechanics in the small shops are usually content with the old-time hand tools and, what is more important, are seldom able to purchase anything else.

Electrical toys have never been introduced into Bolivia, probably because there is little leaning toward mechanical things and little training in this line in the boys' schools. Probably Bolivia will never offer a market for electrical toys.

WIRE AND CABLE.

The largest single item under wire and cable is the flexible cord that is used on practically every house and store lighting installation. In many cases the cord begins at the entrance and is run all around the house because it can be done on one insulator and with a minimum of labor. Moreover, the householder can run the circuits himself to whatever part he wants them and this is the way a large part of the wiring is done. As this cord has to meet the competition of European cord, the Old Code usually has the best sale, as it is less costly. The smaller sizes are the most popular; they are large enough for the current and safety is not a factor.

The wires used are those with standard insulation for inside and outside work. Some time ago Japanese manufacturers offered wire in this market but without results up to the present time.

Underground cable is practically unknown, although one mining company bought, but has not yet installed, some underground cable to use instead of an overhead transmission line. The deciding factor in the purchase seems to have been a desire to minimize the disastrous effects of lightning, which is very prevalent and destructive at the altitude at which the company was working. The central station in La Paz also has a small amount installed but is not purchasing any more.

The telephone and telegraph companies use galvanized-iron wire, sizes 8 and 12, with No. 14 for tie wires. The only cables are used for building entrance at one or two of the centrals.

WIRING DEVICES.

The sale of wiring devices is confined largely to sockets, receptacles, rosettes, and rotary snap switches. Of these, the smaller and cheaper types are most used. All the wiring is run on the surface of the rooms on porcelain knobs of small dimensions, usually smaller than are permitted by the Fire Underwriters, as there is no object in keeping the wire a certain distance from the walls. Cleats are seldom used because the knobs are cheaper and can be used for both wire and cord, thus lessening the number of articles that have to be carried in stock. Tubes with a curve to act as a weather drip are used for entrance bushings, the wires being taken into the building through holes punched in the adobe walls at the point most convenient for the wireman. There are a few high-tension insulators on the lines of stations that have long-distance transmission, and these are of the European design, made of porcelain. The low-tension insulators are of the same material and usually are equipped with curved support, which is molded into the insulator body. Glass is little used for insulation; it is claimed that under the conditions of service in many sections of the country it does not stand up so well as the porcelain. The telephone circuits in the cities are run on porcelain knobs held to the cross arms with ordinary wood screws or sometimes with nails.

BUSINESS METHODS.

REPRESENTATION.

There are no electrical dealers in any of the cities, as the business does not warrant a store's handling only one line. All the machinery-importing houses have agencies of electric manufacturers or will take orders for transmittal to different factories for bids. This method is very ineffective in competition with houses that have resident engineers able not only to advise regarding the proper material to buy but also to assist in its installation when it arrives. It was on this latter basis that certain European manufacturers built up their successful trade. One house now has such an engineer, an English house representing English and Swedish manufacturers. No American factory has adequate representation and it would be impossible to obtain it without sending an American to work on his own account or with an agent. The importing houses as now organized have no engineering staff and there is rarely anyone who understands anything about electrical machinery.

TRAVELING SALESMEN.

In spite of these unsatisfactory features in the present situation, the plan of making an agency agreement with some well-known importing house is practically the only feasible means of putting American machinery on the Bolivian market. The cost of sending salesmen to work up lines in which the demand is as small as it is for practically all classes of machinery is prohibitive. The fees for salesmen's licenses are very high, and must be paid in each of the principal towns. They range from 50 to 1,000 bolivianos ($20 to $400), the average being 250 ($100). In Cochabamba the maximum, or 1,000 bolivianos ($400), is charged. As these taxes are collected by a company holding a concession from the Government, or by individuals, there is a tendency to accept lower figures rather than have the traveler leave without doing any business and hence without paying anything at all; but even so the tax is enough to use up the profit on a good deal of business. Except Sucre and Santa Cruz, the large cities are located on the railroad and the mines are near enough to be easy of access. Administrative offices are usually in one of the towns and much of the business could therefore be done without the mule-back trips of earlier days, although some traveling of this sort is necessary. The traveling expenses are higher than in the United States, both because of the distances and high fares and because of the infrequency of trains. Since the trains may run only once a day, or even twice a week, it takes longer to do the same amount of business. If an agency were established, much of this apparently abnormal expense would fall on it and commissions large enough to cover these costs would have to be allowed.

FINANCING AND CREDITS.

Unless special terms have been made or there is special reason for some other arrangement, payments should be made by the acceptance of 90 days' sight or 120 days' date draft attached to the invoices. There is no need for demanding shorter terms, and business will be gained by not doing so. When the draft is discounted in New York the bank there should be instructed to send it for collection to the agent and not to one of the Bolivian banks. By this means the agent is able to keep in closer touch with the customer and his credit standing. Moreover, the agent can always obtain commercial drafts at a lower rate of exchange than that charged by the bank. When reasonable precautions are taken there should be nothing to fear from losses due to bad credits.

SHIPMENTS.

Many details are to be looked after in making out the documents in order to be sure that everything is correct and that both papers and goods will go through to destination without unnecessary delay or expense. It is assumed that the necessary details of this process have been learned and put into practice, as it is of utmost importance to the recipient that all chances of error or loss be avoided. Small things can cause a good deal of trouble at the receiving end, and American shipments should not contrast unfavorably with those of other nations.

TRADE-MARK AND PATENT LAWS.

The right of exclusive use of a trade-mark may be obtained by application to the Ministerio de Industria at La Paz, at an annual cost of 5 bolivianos ($2). Trade-mark rights may be obtained on cuts or engravings, monograms, vignettes, embossed prints, letters and numbers with special designs, labels, wrappers for merchandise, and any other marks intended to distinguish manufactured articles. The trade-mark, when duly registered and paid for, becomes the exclusive property of the manufacturer or merchant who obtained it, and he acquires the right to oppose its use by other parties. He may appeal to the courts for protection in his right of exclusive use and may assign his trade-mark to another party. Assignments of trade-marks must be recorded in the proper office. The treasury receipt proving the payment of the fee must be attached to all applications. It is highly desirable that all manufacturers contemplating the sale of a trade-marked article in Bolivia should first secure the right to its exclusive use. If this is not done, an unscrupulous person could make trouble for the manufacturer by taking out the exclusive rights in his own name.

All inventors are guaranteed the enjoyment of the benefits of their inventions, provided that they are not contrary to the public order and good morals. The discovery of novel methods or processes in any art or industry is considered to constitute an invention, but contrivances designed merely to modify known devices or to produce merely ornamental articles are excluded. As there is little manufacturing and consequently little likelihood of an article being imitated in Bolivia, there is less need for patent than for trade-mark protection.

RÉSUMÉ OF THE MARKET.

Although the country is the fourth largest in South America and has a population of 2,500,000, it is a poor market for electrical goods, as not over 250,000 persons can be considered probable purchasers of such material. The mining interests increase the field very greatly; in fact, without the mines, the sales would be insignificant. The density of the population is less than five to the square mile and will not increase for many years, as the fertile section is still inaccessible and of the part that is available there are many places where a square mile would not support even a goat. The present figure actually represents a high density because omitting the nonproductive areas, it will be found that the population is thickly settled wherever there is a chance for it. Railroads and automobile roads are being built as fast as the resources of the country will permit, but for a long time they will not be adequate even for present conditions nor will they take care of an increased population with correspondingly greater activity in commercial relations. Until these facilities are improved the cost of transportation both into and out of the country will continue to be so high that many forms of industry that might be carried on can not start, and the sale of operating machinery will be correspondingly delayed. In the mining field to-day many shafts have been abandoned because of being worked out. Other mines are showing signs of exhaustion and this industry may be seriously crippled if development work does not bring to light new deposits. Nevertheless mining will probably form the main support of the wealth of Bolivia for many years, in which case there will always be a demand for electrical machinery. The only thing likely to rival the mining industry as a market for generators, motors, and accessories will be the railroads, if they should decide to electrify their lines. This is possible but remote.

There are no engineering societies and no papers published devoted even in part to engineering subjects. The Bulletin of the Geographical Society of La Paz sometimes contains articles of an engineering nature but only in connection with descriptions of explorations and allied topics. The engineers in Bolivia are invariably mining or civil engineers, as these two branches are the only ones in which there is always opportunity for work.

CHILE.

INTRODUCTION.

The Republic of Chile is situated on the west coast of South America between parallels 17 degrees and 56 degrees south latitude, having a total length of about 2,500 miles and a width varying from 106 to 225 miles. Its northern limit is the Republic of Peru, its eastern the Republics of Bolivia and Argentina, and its southern and western the Pacific Ocean.

From Coquimbo to the north the country is a desert; the average annual rainfall for the entire section is under 3 millimeters. According to the official records covering an observation period of 12 years, the rainfall at Arica has been nil. It is in this region that the famous nitrate fields are located, the two most important being on the pampa back of Iquique and Antofagasta.

At Coquimbo the rain becomes more abundant, increasing toward the south from 100 millimeters, the maximum for Coquimbo, to over 3,000 in the district surrounding Puerto Montt. The surplus water is carried off by some 40 rivers of varying sizes, the largest reaching a flow of 600 cubic meters per second. In many instances the gradient is sufficient to furnish considerable water power, but up to the present time very little development has been made along this line. Numerous irrigation projects, however, have been carried out, making the south-central part of Chile suitable for agriculture and cattle raising. It is estimated that there are 91,000 farms of all sizes, nearly all being located between Coquimbo and Puerto Montt or the Island of Chiloe. The Territory of Magallanes includes the extreme southern region, and is given over to cattle and sheep raising and the meat-packing industry.

The peaks of the highest mountains of the Andes, which form the continental divide, are taken as the eastern boundary, and from them the land slopes very rapidly at first until it reaches a broad central valley or pampa stretching with few breaks from Tacna to Puerto Montt. The western edge of this plain falls away rather abruptly to the Pacific, and on the narrow strip of land that separates it from the ocean are located all the ports of the country. The mountains attain considerable altitude in the north, but gradually dwindle into hills and finally disappear, merging with the low, irregular plateau that forms the Territory of Magallanes. Santiago, the capital, is situated 115 miles inland by rail, at the head of the central agricultural plain and almost exactly midway between the northern and southern extremities of the country. Its altitude is 1,800 feet above sea level. No cities or towns of any importance are at a higher level.

The area is approximately 294,000 square miles and the population, as estimated by the Bureau of Statistics at the beginning of 1916, was 3,789,864, an average density of 13.2 inhabitants per square mile. This is not a correct idea of the actual distribution, however, for out of the 23 Provinces and 1 Territory of which Chile is composed, 11 contiguous Provinces in the central section occupy only 12.5 per cent of the area, but contain 58 per cent of the population, while the two Provinces of Valparaiso and Santiago, with only 2.6

per cent of the area, contain 24 per cent of the population and have a density of 120 inhabitants per square mile. Ninety-six per cent of the people are native-born and practically all are white or mestizo, there being few full-blooded Indians left. The census of 1907 gives an indication of the importance of agriculture and allied pursuits in its comparison of urban and rural population, the latter being 56.6 per cent of the total. The following table gives the area and population by Provinces:

Provinces.	Square miles.	Population, 1916.	Provinces.	Square miles.	Population, 1916.
Tacna	8,996	36,939	Linares	3,968	123,859
Tarapaca	16,686	130,424	Nuble	3,497	191,777
Antofagasta	46,391	192,269	Concepcion	3,311	259,392
Atacama	30,699	63,853	Arauco	2,188	71,639
Coquimbo	14,090	187,105	Bio-Bio	5,351	104,738
Aconcagua	5,404	130,946	Malleco	3,303	130,344
Valparaiso	1,775	333,123	Cautin	6,378	158,606
Santiago	5,890	604,224	Valdivia	8,988	170,424
O'Higgins	2,382	116,980	Llanquihue	34,765	140,017
Colchagua	3,850	162,527	Chiloe	6,977	96,851
Curico	3,044	113,789	Magallanes Territory	65,116	28,746
Talca	3,862	131,067			
Maule	2,810	110,225	Total	289,721	3,789,864

The following table shows the population in 1916 of all Chilean cities having over 10,000 inhabitants:

Cities.	Population, 1916.	Cities.	Population, 1916.	Cities.	Population, 1916.
Antofagasta	56,295	Los Anjeles	15,217	Serena	16,128
Cauquenes	10,502	Lota	11,584	Tacna	11,453
Concepcion	68,902	Parral	11,149	Talca	41,618
Copiapo	10,965	Punta Arenas	20,235	Talcahuano	21,876
Coquimbo	16,902	Quillota	12,857	Taltal	15,655
Curico	21,849	Rancagua	15,449	Temuco	27,616
Chillan	38,543	San Bernardo	11,502	Valdivia	23,464
Iquique	45,502	San Felipe	10,426	Valparaiso	201,507
Linares	14,668	San Fernando	10,675	Victoria	12,131
Los Andes	10,474	Santiago	397,550	Vina del Mar	32,577

FOREIGN TRADE.

Before the war England and Germany had the bulk of Chilean import trade, sharing some 60 per cent of the total trade. The United States came third with 12 per cent but was gaining even in normal times. From force of circumstances the share of the United States rose to 40 per cent of the total in 1916; but this position will probably be lost with the reappearance of strong European competition, for this country has not established even the groundwork of a commercial organization to compare with that which has heretofore done so much to secure this market for the manufacturers and exporters of other nations.

As Chile is largely an agricultural country it is not surprising to find that 78 per cent of the imports in 1916 were classified under the broad designation of products of manufacturing industries. This group includes machinery and implements of all kinds, the second largest item being electrical machinery, with a value of $1,086,134. This was only 60 per cent of the value for 1913, but was greater by 27 per cent than that for 1915, the increase being due largely to advanced prices.

For the last three years stocks have been slowly depleted until there is little surplus in the market. Consequently, there is a tendency to buy more than is actually needed for current requirements. However, the difficulties of getting material of any sort are opposed to this tendency and the net purchases, therefore, are practically at a minimum. New developments are awaiting the reestablishment of more favorable conditions, and it will be some time before the electrical business is in full swing. An estimate based upon the best figures obtainable would indicate that a normal annual demand for electrical machinery and appliances of $1,500,000 is to be expected.

The following table shows the imports of electrical goods into Chile in 1913, 1914, and 1915, and the amounts received from the principal countries of origin:

Articles and countries.	1913	1914	1915
Cable, electric:			
Germany	....	$231,330	$75,535
United Kingdom	....	6,844	30,176
United States	....	98,257	51,546
All other countries	....	4,872	1,575
Total	....	341,303	158,832
Conduit:			
Brass—			
Germany	....	6,189	2,389
United Kingdom	....	231	....
United States	....	47	....
All other countries	....	....	271
Total	....	6,467	2,660
Iron—			
Germany	....	....	737
United Kingdom	....	....	212
United States	....	....	....
All other countries	....	....	1,816
Total	....	....	2,765
Electrical machinery, apparatus, and accessories:			
Germany	$822,879	500,217	231,702
United Kingdom	167,354	66,492	32,748
United States	85,066	145,997	105,082
All other countries	21,829	10,491	44,281
Total	1,097,128	723,197	413,813
Elevators, freight and passenger:			
Germany	6,137	2,025	803
United Kingdom	7,254	....	3,005
United States	....	....	2,278
All other countries	3,446	....	3,485
Total	16,837	2,025	9,571
Insulators:			
Germany	75,589	41,162	12,100
United Kingdom	8,274	7,236	1,521
United States	5,500	65,668	22,167
All other countries	7,905	4,334	1,665
Total	97,268	118,400	37,453
Lamps:			
Incandescent—			
Germany	309,286	105,793	19,403
United Kingdom	14,326	11,842	37,653
United States	58,601	19,069	45,008
All other countries	10,049	7,838	64,726
Total	392,262	144,542	166,790
For heaters—			
Germany	....	....	529
United Kingdom	....	482	197
United States	....	108	....
All other countries	....	....	13
Total	....	590	789

Articles and countries.	1913	1914	1915
Lamps—Continued.			
Hand—			
Germany	$18	$274	
United Kingdom			$15
United States		22	39
All other countries		18	3
Total	18	314	57
Meters, gas or electric:			
Germany	52,232	24,069	4,906
United Kingdom	28,732	11,955	7,658
United States	4,114	3,171	2,108
All other countries		66	1,301
Total	85,078	39,261	15,973
Posts, iron, for telegraph, telephone, or lighting:			
Germany		1,651	5,470
United Kingdom		753	226
United States		13,304	
All other countries		498	
Total		16,206	5,696
Telegraph and telephone apparatus:			
Germany	59,576	28,933	2,117
United Kingdom	42,580	18,704	8,211
United States	3,150	7,002	3,403
All other countries	3,072	3,105	27,547
Total	108,378	57,744	41,278
Telegraph, wireless (all from United Kingdom)	4,244	7,862	36
Street railways, repair parts:			
Germany	684	12,763	
United Kingdom	361		
United States	426		
Total	1,471	12,763	
Vacuum cleaners:			
Germany	480	136	
United Kingdom	33	243	13
United States	171	147	
All other countries		24	
Total	684	550	13
Ventilators, mine:			
Germany	618	1,855	346
United Kingdom	1,316	611	7
United States	20	692	1,010
All other countries		171	919
Total	1,954	3,329	2,282
Wire, brass, copper, and lead:			
Germany	64,193	23,994	4,653
United Kingdom	12,795	3,562	6,018
United States	5,081	17,686	34
All other countries	7,198	2,116	270
Total	89,267	47,358	10,975
Wire, iron, for modistes and electric transmission:			
Germany	9,886	1,693	272
United Kingdom	12,791	1,289	1,184
United States	18	313	776
All other countries	34,858	740	602
Total	57,553	4,035	2,834
Wire, other than iron, for modistes, florists, electric transmission, and medical instruments:			
Germany	234,637	127,969	13,828
United Kingdom	46,081	14,435	5,810
United States	32,687		76,899
All other countries	22,745	276	4,906
Total	336,150	142,680	101,443
Grand total	2,288,292	1,668,626	973,210
Germany	1,636,215	1,110,053	374,790
United Kingdom	346,141	152,541	134,690
United States	194,834	371,483	310,350
All other countries	111,102	34,549	153,380

CENTRAL STATIONS.

Every town of any importance in Chile has its central station, which consists usually of one or more generators driven by crude-oil engines of the Diesel type. In the southern half of the country, or say as far north as Coquimbo, many of the plants are driven by water wheels, as there are numerous streams that can advantageously be used for this purpose. In this same section there is also an abundance of coal and wood, so that some plants generate entirely by steam, using the local fuel under the boilers.

As Santiago and Valparaiso are the largest cities and are respectively five and a half and three times as large as Concepcion, the third city in point of size, the central stations there are the only ones worthy of special mention. In Iquique, Antofagasta, and Coquimbo, the maximum capacity of any plant is less than 1,500 kilowatts and there is nothing unusual in either design or operation. Practically the only station that differs from the average station of the same size in the United States is the one in Concepcion, where the motive power is furnished by a type of engine known as a locomobile, which is making claims for unusually economical operation. The locomobile is a combination of engine and boiler, the former being mounted directly on top of the latter in order to reduce the losses customary where the two are in separate rooms and connected by long steam pipes. This type has found favor in Europe and it is not surprising that it is in frequent use in Chile, where there have always been strong European influences in the electrical industry. Undoubtedly, too, the comparatively low first cost of such machines had considerable to do with their adoption in the early days and in the smaller places, when it was necessary to get the cheapest possible outfit.

Except in Santiago, Valparaiso, Concepcion, and Antofagasta, only the central stations attempt to sell electrical goods to the public. In Antofagasta the central station does a little along this line, but the business is mostly in the hands of dealers, either hardware stores handling electrical goods as a side line or electrical houses exclusively.

SANTIAGO AND VALPARAISO.

The largest central station is the Cia. Alemana Transatlántica de Electricidad en Santiago. This is one of several owned and operated by the Deutsch Überseeische Elektricitäts Gesellschaft, others being located in Valparaiso and Buenos Aires. The generating equipment is located at La Florida, 24 kilometers (1 kilometer = 0.621 mile) from the city and is one of the best hydroelectric installations in South America. There are five generators, three-phase, 50 cycles, 12,000 volts, with a capacity of 3,000 kilovolt amperes each, direct-connected to Francis turbines of 4,000 horsepower. Two of the latter are from Escher Wyss & Co., and three are from J. M. Voith, while all the generators are from Siemens-Schuckert. The turbines operate with a head of 100 meters with water taken from the River Maipo.

From the generating station the current is conducted at 12,000 volts' pressure by means of six three-phase underground cables to the principal substation, a distance of 19 kilometers, whence it is distributed to three other substations about the city. These are equipped with motor generator sets for stepping down to 550 volts direct-current for the street-railway system, 225 volts, also direct-current, for lighting, and 450 volts for motors. In the last two cases the service is actually 220 and 440 volts, respectively. The combined capacity of the substations is 15,000 kilowatts and in each one there are accumulators with a total capacity of 5,700 kilowatts, which is sufficient to operate the tramway for an hour or more. The cables from Florida to the city are from Siemens-Schuckert, the cables in the city itself and the substation machinery are from the Allgemeine Elektricitäts Gesellschaft and the accumulators are from the Accumulatonen Fabrik Aktiengesellschaft, Berlin.

The Cia. Alemana Transatlántica de Electricidad does not retail its current in Santiago but acts solely as a supply company to the Cia. Chilena de Tranvías y Alumbrado Eléctrico (Chilean Tramway & Electric Light Co. (Ltd.)), an English registered company, although owned by the same capital, the Deutsch Überseeische Elektricitäts Gesellschaft, Berlin. This Cia. Chilena de Tranvías i Alumbrado Eléctrico operates all the tramway and power and light systems in Santiago and immediate surroundings, and in addition to purchasing power has its own steam plant in the city. During certain months of the year there is not enough water to operate the plant at Florida and consequently the steam plant is used to supplement the supply. The present equipment consists of several horizontal reciprocating engines of 1,000 and 2,000 kilowatts and one German Curtis turbine of 10,000 kilowatts. For several years there has been on order a 20,000-kilowatt set, which will undoubtedly be installed as soon as conditions permit. The boiler plant is in two sections, one of which is new and contains all the modern improvements, such as pneumatic ash-handling equipment, automatic stokers and chain grates, and power-operated coal carriers and weighers. Owing to the increased cost of imported coal and the difficulty of obtaining it, this company is now using only the product of Chilean mines, which is giving satisfactory results.

The one company in Valparaiso is owned by the same German capital but operated independently. It is known as the Elektrische Strassenbahn Valparaiso Aktiengesellschaft, or Cia. de Tranvías Eléctricas de Valparaiso. Its generating plants consist of a hydraulic station a few kilometers distant and a steam plant in the city itself. Overhead transmission conveys the power from the hydroelectric station, which, however, is not able to function according to the plans of the company owing to lack of water and other circumstances. The steam-plant capacity is inadequate for present needs, and development or expansion is at a halt until new machinery can be obtained. There is at present installed a total of 5,600 kilowatts.

The biggest load is due to the tramway, which consists of about 45 kilometers of track and 72 motor cars. As there are also 27 trailers in operation and each car carries passengers on the roof the capacity is greater than would appear at first. In 1914 there were transported 31,706,187 passengers. In addition to the city service there is a line to Vina del Mar, a suburb 10 kilometers distant. It is understood that this company has been offered for sale to United States capital.

STATIONS AT AMERICAN MINES.

The Chile Exploration Co. (American) operates the copper mines at Chuquicamata, 100 kilometers inland and a few kilometers from Calama, on the Antofagasta and Bolivia Railway. As water power is not available in quantities sufficient for the needs of the company, it has established a plant at Tocopilla, on the coast, where oil-burning boilers furnish steam for operating four 10,000-kilovolt-ampere, three-phase, 50-cycle generators of Siemens-Schuckert (German) make. The voltage is stepped up to 110,000 volts and transmitted to Chuquicamata on a single overhead transmission line mounted on steel towers. At the latter place a duplicate substation receives the current and steps it down to the various voltages used about the mines. The company has recently bought some 25,000-kilowatt turbogenerators in the United States; when installed these will become the main units and the present equipment will be used more for reserve capacity.

The Bethlehem Chile Iron Mines Co., subsidiary to the Bethlehem Steel Co., is installing a central station at Cruz Grande, a port near Coquimbo, to furnish power for the iron mines that it is working at Tofo. In a straight line Tofo is 8 kilometers from the coast, but by the railroad it is 24. In the station are two 3,500-kilovolt-ampere, 2,200-volt, three-phase, 60-cycle generators, and one 300-kilovolt-ampere generator of 600 volts. Part of the current is sent to the mines for the machinery there and part is converted into direct current for the railway. For this purpose there are two 1,200-volt motor-generator sets, composed of one motor and two generators, which furnish current at 2,400 volts for the trolley system to the mines and at 1,200 volts for the third rail on the ore-loading dock. A concrete-pole transmission line carries the current at 22,000 volts to the Tofo substation, where it is stepped down for use around the mine.

Although not yet put into service, this plant has already been the subject of much favorable comment on the part of the many engineers and others who have visited it. Containing, as it does, only machinery from the United States, installed in accordance with the latest practice and with special regard to the local conditions, such as situation, climate, and the work to be accomplished, its influence can not help being beneficial. Engineers now have for the first time an opportunity to acquaint themselves locally with the details of a steam-electric plant of some size, constructed entirely after American ideas.

At Sewell, some 150 kilometers from Santiago, the "El Teniente" district is being worked by the Braden Copper Co. The mining operations here are all underground and the ore has to go through the usual milling incidental to the flotation recovery. The power is furnished by a hydroelectric plant at Coya, which has a normal capacity of 11,000 kilovolt amperes, but as this is not sufficient, a new plant is being built at Pangal for an ultimate capacity of 16,000 kilovolt amperes. There are no electrolytic processes, so all the current is used for light and power, except the small amount used for heating and cooking. The generators and transformers in the main station and substations, as well as all the motors, the equipment now on order for the Pangal plant, and the transmission line are of American manufacture.

LIGHTING.

HOUSE LIGHTING.

The most important use of electricity from the standpoint of business opportunity is for house lighting, practically every home of any pretense having this convenience. In most instances it is of very simple design; single lamps on drop cords are used in the majority of houses, with chandeliers in the parlor and dining room. In Santiago and Valparaiso, and to a lesser extent in the other large cities, there is a small demand for the newer styles, including semi-indirect bowls and wall fixtures. This demand is not so large in proportion to the population as might be expected, owing to the natural conservatism of the people and the lack of competent demonstrators in the electrical stores. All the lamps are of the drawn-wire filament type, even the half-watt gas-filled lamps being used, as European manufacturers make them for 220-volt circuits of as low as 40-watt capacity. Very little advantage is taken of the less usual lighting arrangements, such as porch and closet lights, three-way switches, and drop lights with various outlets at convenient places, partly because the construction of the houses does not permit them and partly because the dealers figure on the cheapest possible job and are not yet sufficiently acquainted with the less common arrangements to undertake to push them in the face of opposition from both competitor and client. The tendency seems to be toward the adoption of advanced ideas, however, since during the last year or two the former strong European influence has been replaced to a large extent by American.

STORE AND WINDOW LIGHTING.

All the better-class stores are well lighted so far as quantity of light is concerned; they use mostly the gas-filled lamps of medium and high capacity. But from a decorative or artistic standpoint there is much to be done. The stores in Santiago, the capital, are ahead of those in other cities in this respect, but even there many stores that could afford better systems of illumination remain content with the old order of things. The smaller stores, and indeed a large number of the bigger ones, still adhere to the drop lamp hung a few feet from the ceiling, occasionally provided with a reflector but more often left bare. Display counters are much in evidence, but the use of special fixtures for lighting them has been quite overlooked. A reasonably large field exists, therefore, for the sale of fixtures for general store and window lighting, the simple forms of globe units and semi-indirect effects being the ones most likely to prove successful in the average installation.

Even in the large cities one seldom finds store windows with any but the most ordinary illumination. Only in comparatively recent times has any progress been noticed in window lighting, because it was looked upon as an unreasonable expense. One of the factors that influenced this situation was the use of the steel blinds or persianas, which are rolled down every night when the store is closed, so that the windows do not remain exposed to the public view after that hour. Some of the more wide-awake store managers, realizing the advertising value of well-dressed windows, now keep them open in the evening and consequently there is more demand for lighting that will show them off effectively. When electricity was first used for stores and windows it was customary to employ arc lamps and therefore a regulation was made that no lamps could be installed in windows containing inflammable articles but that they must be placed outside in order to minimize the fire hazard. This became a habit to such an extent that now even with incandescent lamps one of the commonest forms of window lighting is a high-power lamp in a casing that directs the light toward the window. Another reason for retaining this type of illumination is the fact that it takes the place of an electric sign, since it sheds light over the sidewalk and the walls of the building for a portion of its height. Simple fixtures for this service should be acceptable, but they should be susceptible of easy application, as few contractors or dealers are advanced in the subject of scientific illumination.

ELECTRIC SIGNS.

Except for the ordinary type, consisting of a square box with glass sides and a lamp in the interior, or some equally simple affair, electric signs are practically unknown. The lack of aggressive efforts to install them and the high cost of current are two of the most potent reasons for this situation, as there are many places where both the simple and the more elaborate designs would work out to advantage. An objection against the importation of ready-made signs, however, is the unduly high cost, owing to freight charges on such bulky packages. Signs that can be shipped compactly, such as letters already wired to make some particular sign but knocked down and nested, or that could be kept in stock and used as desired, would be most suited to the market. Wiring should be arranged for 220-volt lamps, as that is the common voltage, unless wired in series, for there is practically no alternating current available to be used with multiple low-voltage wiring and sign-lighting transformers.

STREET LIGHTING.

Practically without exception the towns are lighted by incandescent lamps on multiple circuits. The principal streets and plazas have high-power lamps and inclosed fixtures mounted on ornamental standards, while in the side streets there is nothing more than 40 or 60 watt lamps on brackets or suspended from wires stretched across the street. In many of the smaller towns it is the custom to run the positive wire on one side of the street and the negative on the other, so that when the wires are fastened to each lamp by means of insulating bushings, they serve as suspension and feed wires at the same time, thus saving the cost of an extra wire across the street. In Santiago there are still many arc lamps which can not be replaced yet; they belong to the city under a contract with the electric company, which is not in a position to scrap them and put up incandescent lamps. This will be done before long, however, just as it has been done recently in Valparaiso. In the latter city the mechanism was taken out of the lamps and sockets were fitted in their stead. The result is pleasing, as the arcs were of an old design and the light from them unsatisfactory.

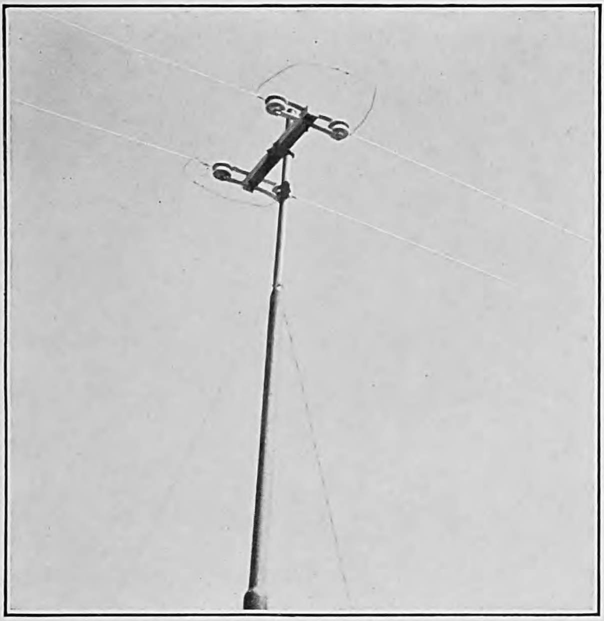

FIG. 11.—STEEL TELEGRAPH POLE, MANNESMANN TYPE.

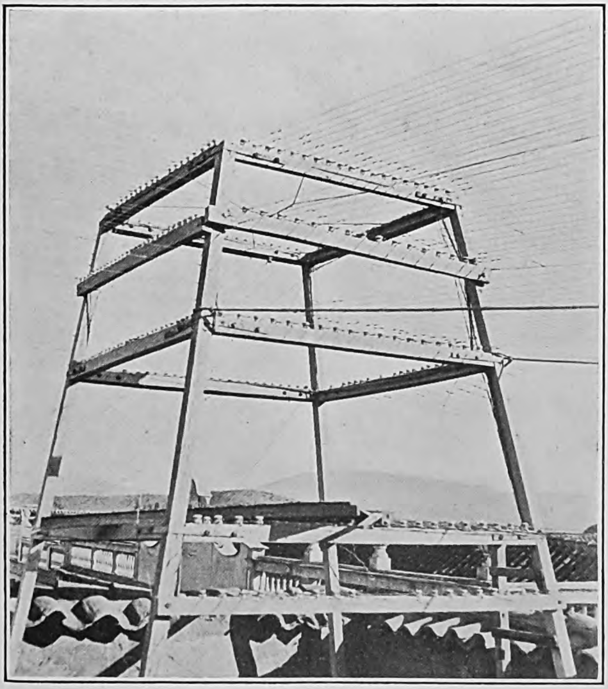

FIG. 12.—FRAMEWORK WITH TELEPHONE WIRES, COCHABAMBA, BOLIVIA.

Gas is a competitor of electricity in public lighting in many cities, especially for public buildings, parks, and the outlying districts. With the increasing cost of coal several plants have been obliged to curtail or suspend operations and it is not unlikely that others will be obliged to do so in the future, thus leaving more room for expansion for the central station.

LAMPS.

A relatively large number of carbon lamps is still being used in the nitrate plants (oficinas) and mills where the vibrations of the machinery tend to shorten the life of metallic filaments. This condition is changing, however, with the advent of lamps better able to withstand these severe shocks. For general lighting purposes the latter are used almost exclusively, while an increasingly large number of gas-filled lamps is being installed in stores and for street lighting. In gas-filled lamps European manufacturers make a half-watt type as low as 50 watts for 220-volt circuits, with horizontal filament, and they are able to obtain a number of orders for other sizes on the strength of having these small units. Such a lamp, with round, frosted bulb, for 220 volts, 50 watts' capacity, sells to-day for 4.90 pesos Chilean paper, equivalent at the present exchange rate (November, 1917) to $1.45. The only European lamps on the market are the Phillips from Holland and the Osram from England, the latter being very scarce on account of the British export embargo. One mark of Swedish lamps has been offered to the wholesale dealers but with little success, partly because they were higher-priced than other marks. It is thought that the makers may be able to lower prices and thus become strong bidders for a share of the business. One or two houses have brought over Japanese lamps, but none have yet been seen in the retail stores.

The demand is mostly for 25, 40, and 60 watt vacuum, and 100, 200, 400, and 600 watt gas-filled lamps. In the latter type there is a sale for capacities up to 3,000 watts. The 300-watt lamp is carried to a small extent, being used as a filler in when the stock of either the 200 or 400 watt size is exhausted. In nearly all the towns the circuit voltage is 220. Concepcion is the largest place with 110. No attempt is made to plot the actual voltages in different parts of the cities; consequently all lamps are required to be rated at the nominal voltage without regard to whether the actual is greater or less. Only Edison screw bases are used, except on the railway coaches, where special low-voltage, bayonet-base lamps are needed. These are bought yearly by public bids, and are sold only by the successful bidder.

Since arc lamps will soon be replaced entirely by incandescents, a description of the arc lamps still in use would be superfluous. The 600-watt lamps are mounted either in the old arc-lamp casings or in new ones designed particularly for the half-watt lamps for lighting important places; and smaller units, either gas-filled or vacuum lamps, are used on the side streets. No bulbs with special glass have been tried nor are there any mercury-vapor lamps.

Automobile lamps should take very well, as large numbers of machines are constantly being imported from the United States, all of which are electrically lighted. There is little country driving, as there are no roads, but the automobiles are used about town and in the immediate suburbs after dark by nearly every owner. In every town also there are numbers of automobiles for hire, mostly of the lower-priced varieties.

The lamps designed for Christmas-tree decorations, imitating fruits and animals, have had some little vogue; but not much of a demand for them can be expected, since it is not the custom to have Christmas trees, as in the United States. Any novelty will in general be slow of acceptation, more particularly because there is no one to put them forward, but also because the people are by nature rather conservative.

OTHER LIGHTING.

There are but one or two examples of flood lighting, and those were displayed only during the festivities incidental to the national holidays. They consisted of temporary arrangements to light the national flag on Government edifices. Only one monument has flood lighting; and along this line there are opportunities, for in every town there are one or more monuments suitable for the purpose. If extended to buildings the field would be much broader. The nearest approach to flood lighting is the brilliant lamps hanging over the sidewalk in front of many shops; the result is a cross between an electric sign and a flood-lighted building, but this method is neither attractive nor efficient.

All churches make use of drop lamps to furnish a certain proportion of the light required but make no effort to obtain special effects by putting in reflectors or indirect-lighting units or concealed lights. In nearly all cases where there are statues on the church, they also are illuminated in some fashion, usually by a semicircle of lamps above them.

The wharves and docks all along the coast are poorly lighted; but perhaps there is no need for more light as practically no work is carried on there after dark. All boats discharge into lighters, and each boat is equipped with its own spot lights for use when loading or unloading at night.

None of the locomotives, of which there are 750 owned by the Government and 450 privately owned, have electric headlights. Owing to the comparatively few trains run a majority operate only in the daytime, but there remain a number for which good lights should be imperative. The usual method of purchase by the Government lines is by public bids issued by the Director General after instruction from the Assembly or governing board. In order to interest them in any proposition it would probably be well to take the matter up not only with the Director General but also with the chief engineers of the various shops. The address of the former would be Director General de los Ferrocarriles del Estado, Santiago, and of the latter Jefe de la Maestranza de los Ferrocarriles del Estado, in each city in which a "maestranza" is located. The names of these cities are included in the trade list referred to in Appendix C.

In 1915 there were in service 825 passenger cars, of which 550 belonged to the Government and 275 to private companies. In addition there were 122 dining and sleeping cars. All the dining and sleeping cars and a number of the first-class passenger cars are electrically lighted, the systems used being English on cars built in England and American on cars built in the United States. The Government is now erecting some very large shops near Santiago in which it intends to build all the cars needed in the future; this would seem to offer an opportunity for the introduction of lighting equipment.

HEATING AND COOKING DEVICES.

There has been practically no progress in the adoption of electrical devices for heating and cooking. The central stations are largely responsible for this condition, because they have never made any effort to acquaint the people with the desirable qualities of electricity for this purpose and have maintained such high rates for current that it is difficult to accomplish anything in that direction. The lighting rate in most places is the equivalent of 25 to 30 cents United States gold per kilowatt hour, and there is no reduction for ranges, radiators, or other heating or cooking apparatus. That this rate is prohibitive will be readily conceded by any one who has had experience in trying to push this kind of material without the cooperation of the lighting company in the matter of rates. In addition to the indifference of the central stations there is competition with the gas companies, of which there are many in the country. The field for gas is constantly narrowing, and as the companies lose their customers for light they turn their attention to securing the wider use of gas for cooking. For those who do not have gas connections in their houses, there is plenty of other fuel—wood, charcoal, and a fair grade of coal being obtained locally at reasonable prices. Kerosene and gasoline stoves are not uncommon, but the cost of all petroleum products is high, as they have to be imported. It is believed that there is a petroleum field in the Territory of Magallanes, and if the prospecting that is being carried on there results in any important discoveries a new source of fuel supply may be opened up to the further disadvantage of electricity.

HEATING.

Except perhaps in the extreme south, no provision is made for heating houses, stores, or offices. The temperature does not fall below the point which those who are acclimated can stand very easily, although to a newcomer the cold becomes very disagreeable in the winter months. The report of the official weather bureau states that the mean temperature of the country north of Puerto Montt is 57° F. for the entire year and 50° F. for the winter. The lowest observed temperature in Santiago, which is one of the coldest cities, is 25° F., but this occurs only at rare intervals and for short periods. Coquimbo is situated a few degrees south of the Tropics and from there to the northern boundary it is always fairly warm. Although the native or the long-time resident hardly thinks of artificial heat, there is a marked tendency to the use of local heaters, which will, without doubt, expand into a well-defined demand for portable radiators of various types. Dealers are showing them in their display windows and demonstrating them in actual operation, but in order to get the best results only light-weight and highly efficient designs should be sent out. Efficiency is important in order to show economy and to keep down the current consumption, so that the heaters can be used safely with the regular house circuits, which are not usually calculated with any allowance for loads greater than the few lamps first put in.

There are comparatively no industries where electrical heating would be an advantage or even a possibility. However, efforts are being made to increase the number and kind of manufacturing establishments throughout the country so as to make it as nearly self-sustaining as possible, and at the same time projects are being launched for developing the hydroelectric resources in order to furnish cheap power. If cheap power can be obtained in large quantities, the character and scope of the industries may change radically, thus opening up opportunities for the sale of material for which there is now practically no field or for which the demand is so slight that it would not pay to do anything with it except in connection with some other form of business. The suggestion has been made that it would be possible to smelt iron and copper ores if there were a sufficient supply of cheap power, such as could be obtained from the waterfalls in certain sections of the country. Nothing has come to a head as yet, however, and without cheap current smelting would not be feasible.

The electric iron finds a fairly ready sale for household use and is easily the most popular of the small heating devices. Nevertheless, the number sold in proportion to the population is small. Practically none are to be found in the laundries or tailor shops, though the latter offer an especially attractive field, as every town has several such shops, for all the better-grade clothes are tailor-made. The tailors still use the charcoal iron, and there has been no serious attempt to show them the economy or convenience of the electric. One should not hope for the results from demonstrations, special sales, and similar schemes that are frequently obtained in the United States because dealers, users, and central stations are too conservative to react to such methods; but they would certainly have an appreciable effect in promoting interest not only in these devices but in other electrical goods. At present there is no chance of making more than a few scattered sales of hair curlers, heating pads, soldering irons, glue pots, or water heaters. More attention should be paid to the several types of water heaters than to the other devices mentioned, for in every house there is some provision for this purpose and it is easier to supplant an article already known and used than to introduce something entirely new. For heating water on a large scale gas will always be a severe competitor of electricity, but for minor purposes the immersion, instantaneous, or other heaters enjoy an increasing prestige and sale.

COOKING.

The field for electrical cooking devices is entirely undeveloped and is likely to remain so for a considerable time. The cost of current is prohibitive and no effort is made by the central stations to encourage the use of ranges, ovens, or other cooking devices. The lighting rate is invariably charged for this service and the customer would be obliged to pay for the new lines that would have to be run and for the larger meter made necessary by the greater current consumed. The stations themselves do not handle ranges, and there are but one or two dealers that have them for display and demonstration. In addition, less than a dozen plants have day circuits, and while these are, of course, the larger ones, they serve a comparatively small part of the population, so that the majority will have to be left out of consideration in this connection. The habits of living are also against a widespread use of ranges or of household devices of any kind, as society is rather sharply divided into two sections, one of which is sufficiently well off to afford one or more servants, while the other is not. The less well-to-do can not afford the electrical devices, while those who keep servants are indifferent to the introduction of new appliances. As servants are plentiful, the saving of their time and labor is comparatively unimportant. The first cost of the appliances and the cost of operation increased through the use of the devices by servants little adapted to care for them properly, loom larger in the householders' vision than the cleanliness or convenience gained through their use. The smaller articles, such as grills, percolators, and toasters, are being sold to a small extent, but they can not be expected to gain the popularity that they have in the United States, where the mode of living is more suited to the part that they can play in the home.

In addition to gas as a fuel there is in general an abundance of wood, while in certain sections there are coal mines that furnish a plentiful supply for all purposes. Fuel cheaper than electric current is therefore plentiful, nor is there any incentive for the people to search for improved methods of cooking and heating. The following were the average prices paid in Santiago in the latter part of 1917, slight differences only being noted in other sections: Gas, $0.095 cents per cubic meter; coke, $2 per 100 pounds; coke-charcoal, $9 per metric ton; wood, in small blocks about 2 inches by 1 foot, $1 to $2.50 per 100, according to the wood and manner of preparation. Electricity varies in different localities but in general costs $0.20 to $0.28 per kilowatt hour.

POWER.

Chile, more than any other of the west-coast countries, offers opportunities for the future in regard to the use of power, and there can be no doubt that most of it will be furnished by hydroelectric generating plants that will utilize the numerous waterfalls of the Cordilleras. The Government encourages the establishment and expansion of industries within the country, mainly by protective tariffs but also in other ways. A large proportion of the raw material is now or can be cultivated locally, while there are large deposits of copper and iron, elements of first importance to any manufacturing nation. The forest reserves are largely inaccessible, and the trees of various kinds are scattered over wide areas instead of more or less well-defined sections that are easy to work. It would be comparatively simple to make great improvements in this respect in a few years of scientific forestry, and it is thought that something of this nature will be tried before long. Considerable exploration has been carried on in the Territory of Magallanes, where traces of petroleum have been noted, but without any result thus far. The coal fields of Lota, Coronel, and Curanilahue have been exploited for many years and produce a fair grade of coal for many purposes. The value of the production for the last five years has averaged over $10,000,000, with a tendency to increase as the prices of the imported coal are advanced. There is a supply of good labor, which is constantly increasing owing to the influence of the large industries already established. Since Chile has in addition a temperate climate, the country combines the most important factors for successful manufacturing.

The three principal fields for the use of power are mining, agriculture, and manufacturing. In Chile mining has had the greatest development up to the present time, as there are four very large properties operating with foreign capital and many small ones owned by Chileans or residents of Chile. It is proper to list under the heading of mines the nitrate oficinas—the establishments where the crude product is dug from the ground and treated by certain processes to extract the sodium nitrate. In agriculture irrigation and preparation of the harvests, as well as the wine industry, are to be considered. In manufacturing there is practically no limit to the possibilities, the only needs being foreign capital or a greater loosening of local purse strings and more initiative on the part of the citizens of the country.

MINES.

The great mineral wealth of Chile to-day comes from its copper, 58 per cent of the production being due to American companies and 20 per cent to Chilean. Next in order of importance come the mines of silver, gold, and iron. The iron mines are entirely in the hands of an American company and are capable of far greater production when their new equipment is in full swing. The output of other metals is insignificant, but both sulphur and lime are produced in large quantities, the value of each being greater than all the metals combined except the four first mentioned. Not even the copper, however, compares with the nitrate, the export tax on which supplies the greater part of the income of the Government. All these mines use considerable power, and much of it is electric. The power installed in 17 coal mines in 1915 was 17,586 horsepower, and in the same year the same number of copper mines reported a total of nearly 71,000 horsepower. The largest of the mines are well provided with modern machinery.

COPPER OPERATIONS AT CHUQUICAMATA.

The Chile Exploration Co. operates at Chuquicamata what is rated as the largest copper mine in the world. It works on low-grade ore found near the surface, the mining operation itself consisting of blasting away the hill, picking up the pieces with steam shovels, and loading them on full-size trains, which carry the material to the treating plant. Powerful crushers reduce the rock to a convenient size and traveling belts convey it to vats, where it is subjected to the action of sulphuric acid for a predetermined time. The liquor is then drawn off and passed through tanks containing electrodes through which a low-voltage electric current flows, thus depositing on appropriate plates the copper that was dissolved from the ore by the acid. In this process a great deal of current is needed and about one-third of this amount is required to drive the various motors throughout the plant. To furnish this current a power station has been erected at Tocopilla, a point on the coast about 100 kilometers distant in an air line from the mines at Chuquicamata. The generators are of 10,000-kilovolt-ampere capacity and are driven by steam turbines, the steam coming from oil-fired boilers. Four units with auxiliary apparatus are located in the main building, while in a high-tension transformer house the voltage is stepped up to 110,000 and sent out over an aerial transmission line to a similar bank of transformers at the mines. This line is in duplicate for the first few kilometers, until it reaches the top of the hills that extend back from the coast to the pampa, and then is single to the substation. The deposits of salts from the sea air make it necessary to shut down and clean the insulators once or twice a month to avoid trouble at the high tension employed and with the two lines it is possible to keep one in service all the time. In Chuquicamata there are transformers for reducing the voltage to a working potential, rotary converters for furnishing direct current to the electrolytic tanks, and a great variety of motors for operating the crushers, conveying belts, cranes, pumps, and other machinery. All the original generators and motors were made by a German concern, but as the mines have outgrown them they are to be held as reserves for new ones that have been ordered from American makers. A new generating station is being erected at Tocopilla to accommodate three 26,000-kilovolt-ampere turbogenerators that are now building at one of the large factories in the United States. These will furnish current for transmission over a new line that is also to be built, the voltage being 125,000 between the central station and the substation. All purchases except strictly necessary supplies or repairs, which are obtained locally, are bought through the home office of the company in New York.

COPPER MINING AT SEWELL.

The Braden Copper Co. is owned by the same capital as the mine at Chuquicamata and is located at Sewell, in the Cordillera of the Andes, some 80 kilometers from Rancagua, which is the same distance south of Santiago. The process here is entirely different from that previously described, as the ore has to be taken from under ground and passed through crushers and other apparatus that is auxiliary to the oil-flotation method of copper recovery. The current is used, therefore, for mining operations, electric railway from mine to crusher, and the motors driving the various machines, such as hoists, shaking tables, Marcy mills, and nodulizers. The generating plant is at Coya, 45 kilometers from Sewell, and consists of three 2,000-kilovolt-ampere generators, water-wheel driven, already in service, and one 5,000-kilovolt-ampere unit that will be ready before January, 1918. The water comes from the Cachapoal River through a canal 12 kilometers long and operates the turbines at a head of about 125 meters. As the plant is much overloaded, a new one is being put in a few kilometers farther upstream on the Pangal River, which will have ultimately four 5,000-kilovolt-ampere units operating with a head of 500 meters. Current will be sent to

Coya and from there to Sewell over the recently built line at 35,000 volts. This line is in duplicate all the way and is made extra heavy on account of the wet snow that is very common in the winter season and adds considerable weight to the wires. At Sewell the voltage is stepped down to 2,300 and 550 for service about the mill and mine. There are comparatively few hoists in the mine, as all the ore is dropped by gravity from the upper levels to the bottom, where it is loaded onto cars that are hauled underground by electric locomotives a distance of 2 kilometers to the coarse ore bins. From here it continues by gravity practically all the way to the smelter. The mines are unwatered by gravity and the natural ventilation is assisted only by a few small fans. Electric haulage by trolley locomotives is used in all the levels with good success. Acetylene lamps are used by the miners, however, as they seem to give better results than the electric lamps thus far tried. All the permanent lighting is electric, with metallic-filament lamps, the illumination being more satisfactory than with the old carbon lamps and the percentage of breakage but very little more. All the electrical machinery in the mine, including the new generators that are to be installed at the hydroelectric station at Pangal, is of American manufacture. Purchases are made by the New York office.

IRON MINES NEAR COQUIMBO.

The big iron-ore deposits at Tofo, near Coquimbo, are being worked by the Bethlehem Chile Iron Mines Co. This ore is very rich in iron, and equipment has been laid down capable of handling it in large quantities. No smelting or refining will be done at the mine, all the ore being sent to the United States for this purpose. The ore is mined in somewhat the same manner as the copper at Chuquicamata, the entire mountain being composed of commercial ore, which is conveyed to the loading docks at Cruz Grande, 24 kilometers distant by rail from the mine. The ore will be stored beside the dock that has been especially constructed to facilitate rapid loading, special boats also having been built for this service. Traveling cranes will keep the bins full, so that when one of the steamers is ready to receive the ore it will be necessary only to open a series of chutes to distribute it to the proper holds. It is estimated that by this method it will be possible to supply the ore more rapidly than the water ballasting tanks can be emptied. Owing to the exigencies of war times it has been impossible to finish building the boats, but work on the rest of the equipment is being pushed forward so that it will be ready at an early date. When all is completed nothing will be lacking for producing the ore on a large scale. Electricity will play an important part in this undertaking, and a model generating station has been erected at Cruz Grande. The present equipment consists of two generators, each having a capacity of 3,500 kilovolt amperes, 2,300 volts, 3-phase, 60 cycles, and one generator with a capacity of 300 kilovolt amperes, 600 volts. The voltage is stepped up to 22,000 for transmission to the mine at Tofo, a distance of 8 kilometers in an air line, and there is stepped down again to working voltages for motors and lights. This line is supported on reinforced-concrete poles, a construction unique on the west coast, which was resorted to when it became apparent that imported wooden poles would be unduly expensive and would delay the construction of the plant, owing to the difficulties of transportation from the United States. The concrete poles were made on the ground by the company staff after their own design. One of the notable features of the generating station is the use of recording and indicating meters for every phase of its operation, including the measurement of oil and steam flow.

To bring the ore down, there has been constructed an electric railway 24 kilometers in length, with a maximum grade of 4 per cent. To haul the trains there are three locomotives, of 120 tons each, with pantograph trolley and third-rail contact shoe. On the ore-loading dock they will operate by means of the third rail, with a potential of 1,200 volts; from there to the mines they will use the trolley and a potential of 2,400 volts. In point of construction they are practically duplicates of the units now running on the electrified section of the Chicago, Milwaukee & St. Paul Railroad, where two are coupled to form one locomotive. The direct current is supplied by two motor generator sets, each composed of one motor driving two 1,200-volt generators, which can be operated in multiple or in series, according to the voltage requirements. The trains will be so scheduled that with regenerative braking the up trains will demand relatively little power from the station, while any excess produced in this way will be taken care of by automatic control panels and water rheostat. All the machinery came from the United States, and the entire plant is a credit to American design and construction. Probably it will not be in full operation for a year or more, so that there will be no immediate need for more machinery. All purchases are made in the United States.

OTHER MINING DEVELOPMENTS.

Another large piece of development work is being carried on by an American firm at Potrorilloa, about 80 kilometers inland from the port of Chanaral, which is 320 kilometers south of Antofagasta. This mine is still in the preliminary stages, but it gives every indication of becoming one of the large producers.

Distributed throughout the country are many small mines, mostly worked by hand, only a few being large enough to require the extensive use of machinery. Among the latter are the coal mines, whose total production in 1915 was 1,300,000 tons. As they have an abundance of coal, they are still using steam power to a great extent, but there is a tendency to substitute electric power on account of its many advantages.

On account of the extraordinary quantity of minerals in Chile, mining is bound to increase and a growing demand will therefore arise for power machinery. It is also conceivable that some of the waterfalls may be harnessed to produce electricity. Electric smelting offers an interesting field for development and would require power in large blocks, or perhaps more mines will find it possible to recover their metal by electrolytic methods. The indications are that one of the most profitable outlets for electric mining machinery and accessories will be found in Chile.

NITRATE INDUSTRY.

The sodium nitrate is found on the pampas of the interior near the ports of Iquique, Antofagasta, and Taltal. These ports are the principal shipping centers if one includes Mejillones and Caleta Coloso with Antofagasta, and Pisagua, Junin, and Caleta Buena with Iquique. From each of these ports there are railways running back to the nitrate fields for the sole purpose of supplying them with merchandise and machinery and bringing back the nitrate for export.

The crude material is found in layers of a few inches to several feet in thickness and usually a foot or two underground. With picks and explosives it is broken into pieces and is loaded onto dump cars, to be hauled to the boiling plant over temporary track, which is extended as the deposits worked are exhausted. The first operation is to crush the pieces brought from the field into smaller pieces of about 1 inch per side. These are thrown into tanks and covered with water which has been used previously for the same purpose and which consequently still contains some of the nitrate. By means of steam coils the water is kept at the boiling point until all the nitrate has been dissolved, when it is passed into other tanks for further treatment. The residue is dumped into small cars and hauled by cable out onto the ripio, or waste pile, and disposed of. From the boiling tanks the liquor is run into evaporating tanks where, exposed to the action of the sun and wind, the excess water evaporates, leaving the sodium nitrate in the form of crystals which resemble wet, compact snow in consistency and appearance. This is broken up and shoveled onto the floor below to dry to the point determined by the regulations governing the shipping and sale of nitrate as a commercial product. It is then taken by small cars to the weighing and sacking machines, where it is finally put up for shipment.

Electricity is used in all except a few of the smallest and least progressive of the 135 nitrate establishments operating in 1917. Aside from lighting, the only purpose for which it is used in some of the oficinas, the current is required for power to run the circulating pumps, the fresh-water pumps, winches, crushers, washers, conveyers, machine shops, and the cable way for the dump. While the oficinas vary in size and in methods used, it is estimated that a mill having a production equal to the average of the better and larger mills now in operation, would require about 300 horsepower. Because of the marked differences among the mills, the services of an experienced engineer are required to estimate the kinds and sizes of motors best adapted for any oficina. To attempt to sell from stock or without making a thorough study of each prospect would be most unsatisfactory.

Oil engines are used to drive the generators in many mills; but, as a large quantity of steam is needed for the cooking processes, the majority are driven by steam engines. One of the most successful types of installation has been the high-speed reciprocating engines suitable for an initial pressure up to 300 pounds and exhausting at a back pressure of 30 to 60 pounds. The engine, made by Bellis & Morcom, in England, is the only one that has proved satisfactory for this service. In one of the recent installations, the company is putting in a steam turbine with an extraction valve, which is expected to accomplish the same result. Direct-current motors are commonly used, since, for much of the machinery, they are better adapted than induction motors, and any individual installation is too small to consider the use of alternating current with converters for producing the direct current that is actually needed. Storage-battery locomotives are being tried out and may find a good field for the short hauls about the mill if not for the longer distances to the diggings themselves. In lighting the mill buildings and yard many carbon lamps are still used, but there is a tendency to replace them with the drawn-wire, metallic-filament type and high-power units.

AGRICULTURE.

From an agricultural standpoint it is necessary to divide Chile into three sections or zones, according to the climate and to other conditions that correspond to special forms of cultivation. The first zone extends from the northern border to Coquimbo and includes territory that is always dry; practically no rain falls and the rivers are few. The land is fertile and only needs water to produce in abundance, as is seen from the few valleys in which it has been possible to introduce irrigation. By the construction of reservoirs to get the most advantage out of the water that is there, many thousands of acres can be cultivated. The northern section would then be one of the richest, as the climate is particularly adapted to the raising of all kinds of tropical fruits and vegetables, which can be harvested all the year round.

The second zone takes in the Province of Aconcagua and the country as far south as Concepcion. This is the region that is now most developed, there being under cultivation some 25,000,000 acres, of which only 5,000,000 acres are irrigated. The Government proposes to construct several large canals, and private companies are engaged in the same work, with the result that water will be available soon for large tracts that now depend solely upon the rains. More than half of the wheat is grown in this zone, and much of the other Temperate Zone cereals and fruits. It is in the same section that the fine wines are produced, nearly 150,000 acres, of which only one-third are irrigated, being devoted to vineyards of Chilean and French plants.

The third zone includes the rest of the country to the south, reaching to latitude 56 degrees, and is plentifully supplied with rain throughout the year. Cereals and fruits grow in profusion with relatively little care, except in the Territory of Magallanes, where the climate it better adapted to pasturage and cattle than to agriculture on a large scale. It is also well suited for sheep raising and most of the wool of the country comes from the clips of this Territory.

In addition to the strictly agricultural pursuits, there are a number of industries derived from or related to farming, such as dairying, honey producing, and preserving fruits and vegetables. In all of these a certain amount of power is required and a good deal more would be used if it were available. In any consideration of the erection of hydroelectric stations regard is had for the surrounding country and the possible demand for current as a basic load.

The Chilean Electric Light and Tramway Co., the power company in Santiago, has already two lines traversing the vineyard section near the city, with extensions to numerous farms, and contemplates running more in order to take in all the larger ones, at least. Possibly it will extend the line to Valparaiso and will supply the many farms and industries of the valley between the two cities with power which it expects to bring profitable returns on the capital invested in lines, extra equipment, and right of way.

Much of the irrigation is done purely by gravity but there is a great deal of land that can not be reached in this way without costly canals and hence lies idle or produces only half what it should. With cheap power the water can be forced wherever needed, reclaiming land that is now worth little. There can be no doubt that the country will continue to absorb more and more electrical machinery, as it must develop its agricultural resources to offset the unstable condition caused by being dependent on others for foodstuffs and relying upon its mines as the only source of national wealth.

MANUFACTURING.

Under the protection of high tariffs, many industries have been able to build up to the point where their products compete with imported material in the matter of price, if not always in quality. With the growth of this local manufacturing has arisen a spirit of loyalty to home products, which causes many people to demand them in preference to others. The effect is not only to increase the business of the factories directly interested but to encourage others to embark on different enterprises, seeing the support accorded those already established. The most successful are the boot and shoe industry, the making of food preparations, and the textile industry, although a more complete list shows that at least 140 industries are being conducted on a commercial scale. According to the Bureau of Statistics of the Chilean Government there are over 5,000 factories, counting the small shops that supply material within a small radius. Probably 1,500 use power machinery and offer an opportunity for the sale of electrical motors and supplies. As few of them trade outside the country, however, it would be almost impossible to reach them except through an agent located in Santiago or Valparaiso and having connections in the different cities throughout the country. As a result of an investigation on the part of the Government, data were obtained on the amount of power consumed in the various broad divisions of industry by 2,406 factories. The following table shows the number of establishments in various industries, the number of machines, and the number of motors in use in 1915, together with the sources from which the motors derive their power:

Industries.	No. of establishments.	No. of machines.	Motors.											
			Steam.		Gas.		Suction.		Hydraulic.		Electrical.		Petroleum.	
			No.	H. P.	No.	H.P.	No.	H.P.	No.	H.P.	No.	H.P.	No.	H.P.
Alcohol and beverages	164	489	76	3,465	7	81	1	16	11	2,031	133	3,442	12	520
Pottery and ceramic.	5	70	1	25	5	69	....	......	1	25	10	91	....	......
Food preparations....	664	1,758	157	6,080	81	876	21	1,684	117	6,204	327	3,823	59	933
Gas and electricity...	79	34	68	24,518	8	570	18	1,040	56	28,590	69	3,241	35	2,880
Shipbuilding..........	11	32	9	594	....	......	....	......	....	....	17	278	....	......
Clothing industries...	280	220	8	191	4	103	7	51	1	25	78	345	1	7
Lumber industries...	206	1,015	147	3,917	12	214	....	......	1	1	71	875	7	166
Building materials...	50	26	9	1,949	2	18	2	60	23	341	20	469	3	244
Textile industries....	26	429	10	894	2	72	4	280	4	435	27	455	2	66
Metals and manufactures...............	177	1,231	23	651	35	350	15	608	6	97	148	940	15	530
Furniture............	59	155	7	106	4	39	....	......	....	....	27	178	1	8
Papers and printing..	139	1,566	5	82	25	312	....	......	8	1,250	323	1,626	1	10
Leathers and furs....	286	2,015	44	1,127	30	313	11	501	10	150	135	1,586	4	58
Chemical products...	99	775	42	981	7	181	5	163	12	329	57	688	6	66
Tobacco manufactures...............	57	634	3	130	7	76	1	20	....	....	69	368	5	21
Vehicles.............	36	174	3	48	8	62	1	22	....	....	29	158	2	19
Other industries.....	68	150	8	27	1	20	....	......	....	....	20	145	1	2
Total..........	2,406	10,773	620	44,785	238	3,306	81	3,445	250	39,478	1,560	18,708	154	5,630

A booklet containing the names of practically all factories now in operation has been forwarded with this report (see Appendix B). It is of relatively little value, as no attempt is made to differentiate between the large establishments and the small ones, many of which are without credit or substantial backing and in no position to do any but strictly local business.

TRACTION.

SANTIAGO AND VALPARAISO.

The street-railway system in Santiago is owned and operated by the Chilean Electric Tramway & Light Co. (Ltd.). It has some 300 motor cars and about half that number of trailers. The current is supplied at a pressure of 550 volts by a number of motor generator sets located at various substations throughout the city, and sent out on overhead trolley wires with frequent connections to underground feeders. Nearly all the cars are of the rigid-frame, two-motor, single-truck type, the maximum seating capacity being 24 inside and 18 on the top. The equipment is of German make and consequently all purchases of new material or renewals are ordinarily made from one or two of the large German factories through the London office of the traction company.

In Valparaiso the Cia. de Tranvías Eléctricas (Electric Traction Co.) has 72 motor cars and 27 trailers operating over 45 kilometers of track. This includes the city lines and one to Vina del Mar, a suburb 9 kilometers distant. Neither in Valparaiso nor in Santiago are there any high-speed lines or modern accessories, such as block signals, automatic switches, headlights, and air brakes. Fare collections are made by women conductors, who issue receipts from rolls of numbered paper tickets, no registering devices being used. The cars are generally well lighted with metal-filament lamps but there are no heating coils, as the winter weather is not sufficiently severe to make them necessary. All purchases for the Valparaiso company are also made in Germany to match the original equipment. The company has its head office in Berlin.

Connecting the city of Santiago with one of its suburbs 8 kilometers to the south is the Ferrocarril Eléctrico de Santiago a San Bernardo (Electric Railway from Santiago to San Bernardo), which is owned by a company of Chilean stockholders. Its entire rolling stock was bought in the United States and consists of 12 motor cars for different classes of service. Current is generated at the company's plant in La Cisterna, about midway between the two places, both steam and water power being employed for operating the prime movers. The line enters Santiago near the center but does not run on the tracks of the railway company there; its own tracks terminate at a point from which it is possible to catch a large number of the 34 lines that cover Santiago in the same number of different routes. New material is bought direct from the makers of the cars or through local dealers who represent manufacturers in the United States.

CONCEPCION.

The Cia. Eléctrica de Concepcion (Electric Co. of Concepcion) is distinct from the Cia. de Luz Eléctrica de Concepcion (Electric Light Co. of Concepcion) in that the latter furnishes current for power and light only, while the former operates the street railway in Concepcion and Talcahuano and the interurban line 15 kilometers long. The cars for the city service are capable of seating 20 passengers while the interurban cars are of the double-truck type and much bigger. This company was begun with American capital when the change was made from mule cars; consequently all material for the power house and the rolling stock were bought in the United States. One of the importing and commission houses with offices in Valparaiso and Concepcion represents a New York firm that has a large interest in the electric railway, and makes all purchases, both for new material and for current supplies and repairs.

IQUIQUE.

There is a tramway system in Iquique but it is still operated by mules and horses. The cars, of which there are 45, hold about 25 people. The service is not all that could be desired for a city of 45,000 inhabitants. Surveys have been made for the electrification of the system, as it is the intention of the owners to make this change as soon as practicable. One storage-battery car with American electrical equipment and batteries has been making trial runs for some time on Sundays and holidays. It has apparently given entire satisfaction although obliged to run over the rails of the mule-car lines, which are not suitable for it. New rails will have to be laid throughout the city before regular service with the heavier cars can be given. The city is built on sloping ground but the grades are easy and the streets wide enough to permit curves of large radii, thus favoring the storage-battery car, while the weather conditions are nearly ideal, there being neither rain nor snow to contend with.

Three-quarters of the stock of the Ferrocarril Urbano de Iquique (Street Railway of Iquique) is owned by the electric-light company (Cia. de Alumbrado), which will profit both by the direct revenues of the railway and by the sale of the current for charging the batteries of the 18 cars that will probably form the rolling stock of the road when electrified, if present plans are carried out.

OTHER STREET-CAR SYSTEMS.

There is no street-car system in Antofagasta, but in many of the small cities, as well as in Santiago, there are mule-car lines, to the number of 24. Nearly half are in Santiago, a survival of conditions existing many years ago. The total mileage of these animal lines is about 175 kilometers, but they are mostly miserable little affairs without hope of ever bettering their condition. About the only exception to this is the one in Chillan, a town of 39,000 inhabitants, which has 8 kilometers of single track within the city limits and connecting it with a town a few kilometers away. Plans are awaiting realization for the construction of a new road to be operated electrically, but owing to the upset conditions existing on account of the war they are practically at a standstill, and no information of definite value is procurable at this time. It is likely, however, that if the scheme is put through the order for the material will be awarded to one of the local houses in a position to assist in the solution of engineering problems and possibly in a financial way.

Several other lines have been mentioned as offering opportunities for electrification, but when investigated they all appear to be nothing but empty schemes. The owners are desirous of seeing the improvements made, but their only idea is to sell the property and let some one else put up the money.

STEAM-ROAD ELECTRIFICATION.

On account of the abundance of water power available there has been a good deal of interest on the part of individuals, and even of the Government itself, in the possibilities of electrifying certain sections of the State railways. Thirteen years ago the Government ordered that a study be made, covering what is known as the second section, or the road from Santiago to Talca, a distance of 250 kilometers. Before the commission appointed to make the study had been in existence four months its functions were suspended for reasons of economy, and their work stopped when they had just begun to collect the preliminary data. In so short a time it would be impossible to reach any conclusion that could be considered final, but from a first compilation of the facts at hand it was shown that considerable economy would result in the operation of the section when electrified. It was felt by the Government, however, that the time was not yet ripe for a radical change of that nature. Consequently the matter was dropped and nothing further has been done. Nevertheless many believe that this electrification must take place some day, and consequently a continual agitation of the subject has been kept up to prevent it from falling into oblivion. That this procedure may result in an early reconsideration of the decision to abandon the idea of electrification seems probable. It is believed that the authorities will arrange for a new study to be made soon after normal conditions are restored. It is interesting to note that the members of the first commission, after weighing the relative advantages and disadvantages of direct current, three-phase alternating current, and single phase, decided that they were justified in adopting single phase as best suited to the work in hand. On this assumption they calculated that the main generating station would have to have a capacity of 7,500 kilovolt amperes, and that the total cost of making the transformation, including the hydraulic works, electrical installation, and locomotives, would be approximately $3,000,000, this figure being held to be higher than actual cost rather than lower.

The power was to be generated in a hydroelectric plant to be located on the Cachapoal River a short distance from Rancagua, which is nearly halfway between Santiago and Talca. From this plant transmission lines would take the three-phase current at a potential of 30,000 volts to five substations located along the railway, from which single-phase feeders would be led in order to supply the overhead trolley with current at 7,500 volts' pressure. It is on this river that the generating station of the Braden Copper Co. is located, although considerably farther upstream than the proposed site of the Government station. In view of the great advances made in the electrification of steam roads since the date of the preliminary study of this second section of the Chilean State Railways, it is assured that whenever a new study is made the single-phase system will not be adopted without an exhaustive review of the merits of the others. Preliminary data will be compiled by the Government engineers, after which the call will be made for bids from any manufacturer who cares to make them, with the probability of a prize being offered for the successful bidder and other sums being awarded to each contestant presenting a worthy proposal.

The electrification of the first section of the State Railways, or the line between Valparaiso and Santiago, was first given serious consideration when the Sociedad Italiana Westinghouse presented a project to the Government based upon a complete study of the situation made upon their own initiative. It attracted so much attention that the Government was prevailed upon to call for tenders, setting June 15, 1910, as the date for closing bids. Two bids were received, one from the Italian Westinghouse Co. and the other from the Siemens-Schuckert Co. A year or more later a large American company put in a bid that was rejected as being inadequate and lacking many essential details. A commission of engineers was appointed by the Government to compare the tenders and decide which of the two offered the more advantages. The report of the majority was published in 1914 and the conclusions reached therein were that the proposition of the Westinghouse Co. was decidedly superior to the other and that the Government should electrify the first section within as short a space of time as possible. For various reasons, however, all action has been postponed indefinitely, although there is every expectation that this electrification will be carried out in the not far distant future.

The Siemens-Schuckert plans were based on a single-phase system having a trolley voltage of 15,000 volts, which would be reduced to the motor voltage by stationary transformers located on each locomotive. The current was to be generated in a hydroelectric station on the Aconcagua River having five water wheels operating with a head of 140 feet and driving generators of 2,500-kilovolt-ampere capacity, single-phase, 15⅔ cycles. Transformers would step the potential up to 50,000 volts for transmission to the five substations that it was intended to erect at convenient points along the railway. For reserve the plans called for an oil-burning steam plant with generators of the same capacity.

The Westinghouse Co. offered a three-phase system with trolley voltage of 3,000, using as conductors two overhead wires and the rails. It planned also to generate current in a hydroelectric station on the Aconcagua River, using Pelton wheels with a head of 750 feet driving five 4,500-kilovolt-ampere, 6,000-volt, 15-cycle, 3-phase generators, the voltage being stepped up to 40,000 for transmission to the 15 substations. The steam reserve plant wuld have two turbogenerators of 6,250-kilovolt-ampere capacity each, having a total maximum overload capacity for a short time of 20,000 kilovolt amperes.

This scheme is one that can interest only strong companies, since it is of paramount importance that the successful bidder be prepared to make the entire installation and superintend the operation for a period of 25 to 35 years. It would receive payment almost entirely out of the economies effected by the Government from having electrified the road.

TELEPHONES AND TELEGRAPHS.

THE CHILE TELEPHONE CO. (LTD.)

Except in Punta Arenas, Puerto Montt, Valdivia, Antofagasta, Arica, and Tacna, the Chile Telephone Co. (Ltd.), or Cia. Inglesa de Teléfonos, as it is better known locally, has established offices in practically every town and city of Chile. The company is organized in England and has a board of directors in London, with managers for each of the exchanges and a general superintendent of all activities in Chile, located in Santiago. Its capitalization is modest and as all improvements are made out of actual earnings, it is in a very strong financial position. From time to time one hears complaints regarding the service, but it is probably as good as can be given under the peculiar conditions that surround the company's operation. It would not pay to install the most modern equipment and consequently the company is making only as much progress along this line as conforms to the general progress of the several communities in which it operates. It is continually in touch with the situation, however, and is ready to do whatever is warranted at any time to bring its service down to date. It is preparing to install an automatic system in the business district of Valparaiso, the conduits being constructed and the wires practically all drawn in. This service will be confined to the center of the city, at least for the present, being intended to give the business houses a more rapid means of intercommunication. The present system of local battery, magneto-ringing instruments will be continued in the residential district and in all parts of the business district except the center, until such time as an extension is warranted by the growth or advancement of the city.

Throughout the country there are 190 offices belonging to this company and there are in operation some 13,000 instruments, all but a few of the latest being of European manufacture. The current is supplied by cells, mostly of the Leclanché type, placed at each instrument, there being central battery only at Valparaiso and Santiago. In both these places, however, as well as in the small cities, the ringing is accomplished by hand magnetos and the usual custom is for the person at central to make the connection while the subscriber does all the ringing, both for calling the person desired and for advising central when the conversation is concluded. In Santiago all the cables are underground, aerial wires being used only for local distribution from the various junction boxes, but in other places all the wires are overhead, the circuits being composed of iron wire with earth return. The total extension of wires is 42,000 kilometers, the poles carrying them being of wood, iron tubing, or structural steel, according to the location and the requirements. To operate this system there are required about 13,000 cells, very few of which are dry, as the others have given much better results and last longer.

All purchases are made by the London office, but as the general superintendent in Chile has a good deal to say regarding the specific types and makes of apparatus or supplies that should be used, it is recommended that anyone interested in introducing standard material or novelties for telephone work send samples to or communicate first with him.

CIA. NACIONAL DE TELÉFONOS.

A concession for a second telephone company to operate in Santiago, Valparaiso, and neighboring towns was issued by the Government in June, 1908, which is now known as Cia. Nacional de Teléfonos (National Telephone Co.), its head office being in Santiago. It has approximately 4,000 kilometers of wire in its circuits and 2,200 instruments, which are furnished with current by 4,000 cells. Practically all the distribution to subscribers is accomplished by overhead wires direct from the central offices. The characteristics of this company are similar to those of the English company—European instruments with local batteries and magneto ringing, galvanized-iron wire, single-circuit, ground-return distribution system. The only apparatus employed is the combined transmitter and receiver in one piece, which is considered more convenient than the separate, or American, type.

Negotiations are already being carried on to obtain capital from the United States with which to expand the activities of the company and increase its scope. The promoters of the scheme intend to give greater competition to the English Telephone Co., both in Santiago and Valparaiso and in the Provinces, and to obtain a larger portion of the business than can be done with the present methods of conducting the business. The principal factor in the plan is the installation of complete new equipment of the latest type of apparatus and switchboard. This should give better service than any at present in existence and insure a rapid growth to the new company. Then, by buying up or working in conjunction with some of the smaller independent companies in the country districts, it would be possible to extend operations throughout the Republic. If this deal should go through the equipment installed will be a model for future plants and a good advertisement for American telephone apparatus, of which there is now scarcely a specimen to be found in Chile. This condition seems to be due mostly to the fact that European manufacturers have been better represented in South America and their product is more suited to cheap installations, such as are needed in pioneer work or in countries that are sparsely settled and but little developed commercially. With the increase in population and business activity in these countries a need is felt for improved methods of communication, which will undoubtedly be supplied to a great extent from the United States, where the art of telephony has made more progress than anywhere else in the world.

The greatest field for the immediate expansion of business in Chile lies in the home telephone. It is the exception rather than the rule to find a telephone in a private home to-day, outside of the city of Santiago. Here lies one of the opportunities ahead of an energetic management prepared to develop the situation along advanced lines, provided that they furnish only the elements adequate for the market and do not burden themselves with unnecessary expenses incidental to a too enthusiastic and radical change from the old system to the new.

CIA. DE TELÉFONOS "BIO-BIO."

The Cia. de Teléfonos "Bio-Bio" has its head office in Los Anjeles, Province of Bio-Bio, and is the property of Laing y Cia. About half of its present business is done in Los Anjeles, where there are some 250 instruments, either in the town itself or in the numerous farms that surround this city. The remainder of the business is done in the many small towns in the immediate vicinity, but the most important line is the one that reaches Concepcion, a distance of 100 kilometers. It is intended to carry the line through to Talcahuano, the port of Concepcion, when the company will be able to solicit more business in those two cities, as traffic between them is of more importance than that between Concepcion and any of the towns in the interior. As Concepcion is the foreign-trade center of a section of the country in which are located large coal-mining interests and many of the best agricultural and cattle-raising properties, good telephone service is highly desirable to enable the machinery and commission houses to keep in touch with their branches and clients. It should be a good region in which to introduce modern equipment. The English company, however, is already established and has over 1,100 subscribers in Concepcion and Talcahuano; in addition, it has connections with many towns not reached by any other telephone company. The only advantage that they lack is a line to the south. However, the management of the "Bio-Bio" company is progressive and will undoubtedly continue to expand, thus increasing in purchasing ability. For supplies and general material this will afford an opportunity to all manufacturers but those of instruments. The company will continue to buy the type of Swedish apparatus that it now has in order to keep it uniform and insure satisfactory operation.

EMPRESA DE TELÉFONOS DE ANTOFAGASTA.

The third largest installation is that in Antofagasta. It has some 700 instruments in service and covers many of the near-by towns and nitrate oficinas, as well as the city itself. It has an extension of wires of 2,500 kilometers and uses 1,800 cells to produce the current. The instruments are all of the local-battery, hand magneto ringing type and of European make. The circuits are all serial and consist of iron wire, galvanized, or, in some instances, of copper wire. This company also is located in a region that should be susceptible of considerable growth, and it is practically without competition. A concession was granted in 1916 for another company in the Province of Antofagasta, which should also have the right to operate in the entire Republic. The owner is understood to have made an arrangement with the proprietor of the Antofagasta company to work together or to purchase his company and to be seeking capital in the United States to use for remodeling the plant and give modern service. As Antofagasta is the fourth largest city in Chile, having 56,000 inhabitants, and is the seaport at which the greatest number of tons are handled, it unquestionably needs an up-to-date telephone system and offers a good investment for whoever takes up the proposition. The quicker the project is taken up the less will be the expenses of changing over and the less will be the likelihood of competition.

OTHER TELEPHONE COMPANIES.

Among the smaller companies there are three worthy of mention—those in Tacna and Arica, Valdivia, and Punta Arenas. The system in the first two places is owned by the Cia. de Telégrafos á Bolivia, with head office in Tacna. This is a stock company, which also operates a telegraph line from Arica to various offices, including La Paz, in Bolivia. It has some 350 subscribers in the two cities, using Swedish instruments, overhead iron wire, and about 400 Leclanché cells for power. It has been in operation for many years but is not growing, as the combined population of Tacna and Arica is only 20,000 and has a tendency to decrease.

In Valdivia is the Cia. Nacional de Teléfonos de Valdivia, which has been established only four years. It operates in several of the near-by towns over about 700 kilometers of wire and with 550 instruments. Valdivia is a town of 23,000 inhabitants and the company should have a good future, as the vicinity is prosperous and fairly advanced industrially and commercially. The owners are Germans and prefer to purchase all their material from one of the German electrical houses. There is little likelihood of any American manufacturer finding here an outlet for his product.

The company in Punta Arenas, a city of 20,000 inhabitants in the southern part of the Territory of Magallanes, has an extension of 1,500 kilometers of wire and uses 450 instruments. On account of the growing importance of this city, due to the activity in exports of cattle, hides, and meat, it is reasonable to believe that this number should be augmented considerably, especially if it becomes customary to put instruments in the homes as well as in the stores and warehouses.

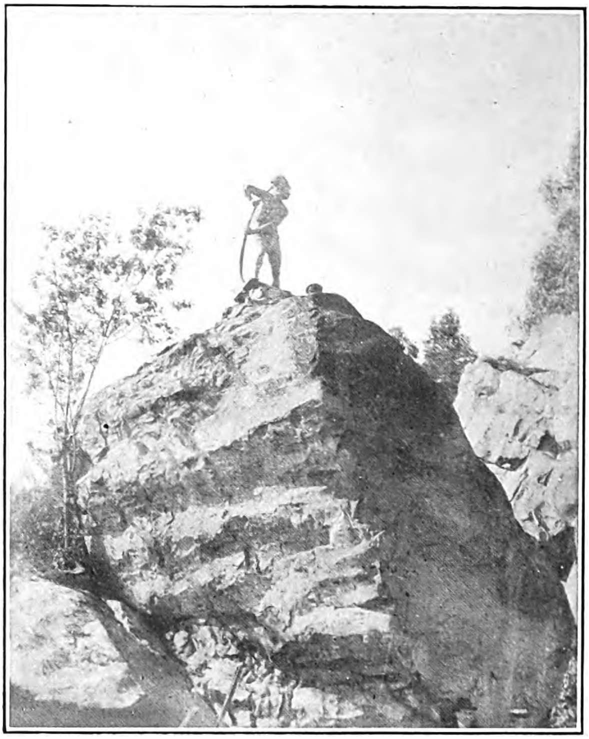

FIG. 17.—STATUE OF CAUPOLICAN, SANTIAGO. THE SEARCHLIGHT USED TO ILLUMINATE THE STATUE CAN BE DISTINGUISHED NEAR ITS BASE.

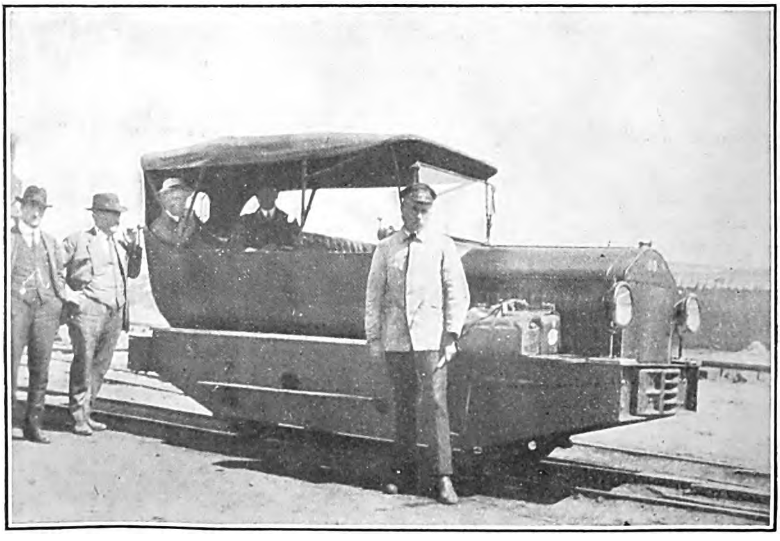

FIG. 18.—GASOLINE AUTOMOBILE-TYPE MOTOR CAR USED BY COPPER COMPANY IN CHILE ON PRIVATE RAILROAD FROM RANCAGUA TO SEWELL.

The following table gives a list of the telephone companies of Chile, with data regarding the length of their lines and the amount of their equipment:

Companies.	Head offices.	Line.	Wire.	Instruments.	Cells.
		Kilometers.	*Kilometers.*	*Number.*	*Number.*
Cia. de Telégrafos á Bolivia	Tacna	310	840	310	350
Cia. de Teléfonos de Calama	Calama	279	303	68	144
Ferrocarril de Antofagasta á Bolivia	Antofagasta	609	924	165	230
Cia. de Teléfonos de Antofagasta (Jerónimo Yancovich, owner).	do	430	2,350	620	1,750
Empresa de Teléfonos de Taltal (Perfetti, Gofferry y Cia., owners).	Taltal	357	580	100	210
Ferrocarril de Copiapo	Copiapo	15	15	30	60
Framulic y Cia	Vallenar	290	682	162	310
Cia. Chilena de Teléfonos de Ovalle	Ovalle	400	650	90	120
Cia. Nacional de Teléfonos	Valparaiso	1,900	4,000	2,200	3,550
The Chile Telephone Co. (Ltd.)	Santiago	38,176	41,368	12,814	25,802
Mario Ibar y Federico Mason	Constitucion	146	210	52	104
Cia. de Teléfonos "Bio-Bio" (Laing y Cia.)	Los Anjeles	1,250	3,350	450	1,000
Cia. Nacional de Teléfonos de Valdivia	Valdivia	320	650	520	1,100
Sociedad Progreso de Llanquihue	Puerto Varas	270	570	201	420
Baeriswyl y Cia	Punta Arenas	700	1,200	410	530

TELEGRAPH LINES.

The telegraph systems in Chile are operated by private companies, by the State Railways, and by the Government. In 1916 there was a total of 31,127 kilometers (19,341 miles) of line in service, but as many of these lines had duplicate wires the number of kilometers of wire composing them was 55,000. There were 1,910 instruments of different kinds, an increase of 436 in five years. Practically all the current was furnished by some 46,000 cells of the Leclanché or Crowfoot types. The following table gives the names and addresses of the private companies, together with data relative to the equipment owned by each:

Companies.	Principal offices.	Line.	Wire.	Instruments.	Cells.
		Kilometers.	*Kilometers.*	*Number.*	*Number.*
Cia. de Telégrafos á Bolivia	Tacna	512	574	6	350
The West Coast of America Telegraph Co. (Ltd.).	Santiago	195 a 2,534		17	252
Anglo Chilean Nitrate & Railway Co. (Ltd.)	Tocopilla	117	117	4	180
Antofagasta & Bolivia Railway (Ltd.)	Antofagasta	956	2,954	188	6,188
Taltal Railway Co. (Ltd.)	Taltal	210 b 89	299	19	1,180
Chilean Transandine Railway Co	Los Andes	63	126	6	209
Central & South American Telegraph Co.	New York	424	1,058	20	815
Cia. de Telégrafo Comercial	Santiago	1,678	8,050	148	5,100
Cia. Telégrafo Nacional	do	130	520	8	280
Cia. de Arauco (Ltda.)	Concepcion	91	91	10	250
Ferrocarril Transandino por Antuco	Monte Aguila	72	144	5	140

a Cable. b Telephone.

The State Railways (Ferrocarriles del Estado) have approximately 8,600 kilometers of line and 725 instruments. In addition there are 760 auxiliary telephones operating over 1,850 kilometers of line and for these two classes of service there are 14,300 electric cells. All purchases are made by the office of the Director General de les Ferrocarriles del Estado, Santiago, based upon bids made in accordance with specifications published as occasion requires.

The Government telegraph lines (Telégrafos del Estado) extend from Iquique to Punta Arenas, having a total of 365 offices using 754 telegraph instruments of the following kinds: Wheatstone, 11; Wheatstone duplex, 3; Hughes printing, 2; Morse, open circuit, 494; Morse, closed circuit, 150; Morse, relay, open circuit, 29; Morse, relay, closed circuit, 23; Morse, duplex, open circuit, 42.

For local operation there are also 84 telephones. The length of the lines is 15,600 kilometers and of the wires 29,440 kilometers. The current for this system, which is not taken from central stations, as at Santiago, is supplied by 19,000 cells located at 333 different offices. The electrical material required each year differs from any other year but in 1915 amounted to $20,000, most of this sum being spent for repairs and supplies rather than for new apparatus. As in the case of the State Railways, all purchases are made by public tenders, these being issued by the Director General de los Telégrafos del Estado, Santiago.

The Cia. de Telégrafo Comercial has been established for 35 years and has lines extending from Valparaiso to Valdivia connecting all the intermediate cities. In its 100 offices there are 150 instruments, and the wires cover a distance of 8,050 kilometers. The head office is at Santiago. There are other companies, but this is the most important one devoted exclusively to telegraphy. It does not attempt to reach the small towns whose business would not be sufficient to pay a reasonable profit on the investment. The Government considers that it is one of the functions of its own lines to give service to such localities, assuming the expense to be justified in view of the beneficial results to the country as a whole. There are low and uniform rates to all parts, and the number of telegrams sent in proportion to the population is larger than in many countries. Consequently the telegraph companies, if not wealthy, are at least in reasonably good financial condition and in a position to keep their equipment and lines up to date.

WIRELESS TELEGRAPH.

There are seven wireless stations in Chile, located at Arica, Antofagasta, Coquimbo, Valparaiso, Talcahuano, Punta Arenas, and Llanquihue. These are under the direction of the Minister of Marine and are primarily for the use of the Navy. In course of time, however, they will be fully equipped and arranged for public communication between stations and from any of the stations to ships in the Pacific that may be within the range of the instruments. Both Telefunken and Marconi apparatus is installed, the former only in the Talcahuano station. Any new material will probably be of the latter type. The business of the Marconi interests in South America amounts to a practical monopoly, and it would be difficult, if not impossible, for any new concern to break into the field, especially if its instruments are based on a different system, so that there might be some doubt as to their satisfactory operation in connection with those already installed. All matters regarding the wireless system and purchase of new material are in the hands of the Dirección General de Armada, Valparaiso.

One small wireless outfit is used by the Bureau of Telegraphs for transmitting messages across the channel between the mainland

and Chiloe Island, a distance of 5 kilometers. This was adopted as the only feasible means of communication, owing to the heavy seas which occur frequently, destroying the cables soon after they are laid.

HYDROELECTRIC PLANTS AND POSSIBILITIES.

One of the greatest resources of Chile lies in its water power, practically all of which is now going to waste. Many high mountains of the Cordillera of the Andes are covered with snow a great part of the year. Those that are not are the scenes of frequent storms during the summer season, when snow and rain fall in abundance and the flow off forms the numerous rivers found in the most densely populated portion of the country, from Coquimbo to Puerto Montt. A large quantity of water is now used for irrigation and new irrigation canals are being constructed every year, but all this occurs in the comparatively flat central valley at the foot of the mountains after much of the power has been dissipated in the rapid descent to the plain. The two noteworthy installations to turn this power into useful work are those of the Chilean Electric Tramway & Light Co., Santiago, where the Mapocho River generates 15,300 kilovolt amperes, and of the Braden Copper Co. at Coya, on the Cachapoal. The capacity of the latter plant is 13,000 kilovolt amperes, and the same company is constructing a new plant on the Pangal River, a tributary of the Cachapoal, to generate 15,000 more. These operate with a head of about 100 meters, but the Pangal head will be three times as great. That many other stations could be established if there were need for them or if there were anywhere to sell the current can be seen from the following table of the rivers, with their flows, as measured by one of the offices of the Government. The flow is not usually taken at the precise point where the power could be utilized, but in nearly every instance it is sufficiently large to supply large amounts of power at all seasons of the year. The flow is irregular, there being a great difference between minimum and maximum; all the rivers are subject to freshets and droughts, according to the season. Much of the trouble arising from such changes can be avoided by the construction of dams and reservoirs. In any comprehensive scheme for the development of this resource on a large scale, retention works would form an important and expensive part of the program.

The flow of the most important rivers in Chile is as follows:

Rivers.	Length.	Flow per second.	Rivers.	Length.	Flow per second.
	Kilometers.	*Cubic meters.*		*Kilometers.*	*Cubic meters.*
Aconcagua	190	50	Bueno	200	600
Maipo	250	80	Maullin	140	100
Mataquito	230	58	Puelo	150	100
Maule	280	300	Yelcho	225	150
Itata	230	60	Palena	300	150
Bio-Bio	380	500	Aysen	180	300
Imperial	220	600	Baker	440	500
Tolten	250	300	Pascua	285	300
Valdivia	250	600			

In addition to the rivers listed in the table, there are many more of much smaller flow, on nearly all of which little water wheels have been erected to run electric-light plants or flour mills. In the latter case the power is transmitted direct to the mill by means of wire rope or shafting. No exact data are available regarding the power that could be obtained from these rivers, but the total is undoubtedly enough to supply the country for an indefinite period even if the industrial expansion continues at the present rate.

Concessions for developing water-power sites may be obtained from the Government at comparatively small cost and with few obligations other than that of starting and completing the installation within a certain time. In case of unforeseen circumstances this time limit can be extended for a reasonable period, the object of placing this restriction being to prevent holding a concession for speculation and to insure its being used in a manner to benefit the country as a whole. In applying for a concession it is required that a fairly detailed study of the project be presented, in conjunction with maps, drawings, and other information that will enable the Government engineers to check up the feasibility or desirability of the project. The concession is granted or refused according to the findings of the engineers. One of the chief considerations is that there be no conflict with previous decrees granting power or irrigation rights. This is of obvious importance to the person who wishes to invest capital in an enterprise of this nature, as it insures that he will not receive a concession which might become the subject of litigation nor will he be molested at a later date by the issuance of another concession infringing upon his own. Since this whole matter is subject to local rather than Federal law and any privilege granted to-day is strictly limited to the conditions of operation set down in the request, there is nothing to prevent the enactment of future laws that may annul some of the most valuable features of the concession as originally obtained. For example, it is the custom to make the preliminary project on the basis of development that can be carried on at once, with the expectation of applying later for further rights as the demand increases. To apply for them at the moment would be folly because they could not be used and technically the concession would thus be liable to revocation because the terms had not been complied with. Again, neither the taxes nor the time for which the rights may be enjoyed are definitely fixed and while it is not likely that unfair legislation would be enacted on these points, it would certainly be of considerable encouragement to foreign capital to know beforehand that the data on which they have calculated their possible returns are not subject to influences which may upset these calculations. On the whole, however, conditions are improving. Up to 10 years ago all concessions were made by the governors of the different Provinces. Since then this work has been in the hands of a department of the central government with the result that all the later legislation has been progressive. It is reasonable to believe that ample protection will be afforded to capital invested in the exploitation of such concessions.

As previously pointed out, manufacturing is increasing rapidly under the encouragement of the Government and with it grows the need for power. There are extensive coal mines in the southern region, but these supply only a small part of what is needed, large quantities being purchased abroad annually. Moreover, the domestic coal is not of the highest quality and is but little suited for many purposes. On the other hand, an abundance of water falls rapidly down the slopes of the Andes, which are in no place more than 360 kilometers distant from the coast and even approach to within 100 kilometers at times, thus making nearly ideal conditions for the generation of electricity and its transmission to the near-by centers of industry, where it is to be consumed.

Considering, then, the growing demand for cheap power, the absence of abundant and suitable fuel and the presence of practically unfailing water power, Chile offers an opportunity for profitable investment in the development of its hydroelectric resources, which are not equalled by those of any other country in South America. It is an opportunity worthy of careful investigation and study, especially by those who are building for the future, for it holds many possibilities to the first who will take advantage of it.

THE LONGITUDINAL ARTERY.

Early in 1916 it was proposed to the Government that it authorize a study of the water powers of the country, having especially in mind the construction of a transmission line throughout the length of central Chile or from the Aconcagua River to Valdivia or possibly to Puerto Montt. The idea was to establish generating plants at various points and feed into the one transmission network, which should thus be in a position to furnish a constant supply of power at low rates for light, power, and general industrial purposes. One of the factors contributing to an immediate consideration of the subject by the authors was the declaration by an American engineer before the Second Pan American Congress, held in Washington in 1915, that conditions of modern business progress in the application of industrial electricity "conduce inevitably to the elimination of small and noneconomical power installations to give place to the establishment of large, unified, and highly economical systems for the production and transmission of electric power." In the main part of the proposition the following argument is given as the basis of the decision to request the study:

> Chile is a country most singularly favored for the realization of a plan of this sort. Its configuration and the numerous streams that cross it from east to west favor, in a peculiar manner, the establishment of a great longitudinal artery for the distribution of electrical energy, one that would be fed by various generating stations, conveniently spaced. We estimate that the central zone alone, or that included between the Aconcagua River and the region of the lakes in the south, represents utilizable power to the amount of 1,500,000 kilowatts (2,000,000 horsepower). Of this sum, the use of some 100,000 kilowatts is considerably in excess of the present restricted conumption, restricted because of the expensive service and the lack of distributing networks, even in the most important and productive regions of the country.
>
> There exist at the present moment indisputable manifestations that the forces at work among us tend toward the establishment of new industries and to the broadening and consolidation of those already in existence. However, it is not with the large enterprises that we are most interested, except in special cases, such as the one that we now have in mind and others that we might mention. One of the proofs of the true economic development of a country is seen in the distribution of its wealth. In the countries that are best organized, the small industries, on account of their number and also the

number of workmen that find occupation therein, represent the greater part of its wealth. The movement that is here outlined and that we wish to further, is designed to benefit these industries—the principal factor of such an attempt being the one already twice mentioned in the course of this presentation. [Reference is made to a previous statement to the effect that such a central system would guarantee cheap energy, continuous service, and permanent production in all parts of the country.]

The present situation is favorable, without doubt, to the investment of the capital necessary to organize a company for the generation of electric energy for the whole of central Chile. The possibility of this is attested by the increasing number of similar enterprises which are being undertaken in other countries, principally in the United States, and which, even if they exceed in magnitude any that would be necessary here, correspond in few instances to a more evident want or to a greater ease of realization from a technical point of view.

Granting the advisability—or rather the necessity—that a company of this kind be national in its character, it belongs to the Supreme Government to assume the initiative in the matter, fixing the general conditions on which it would be disposed to favor the organization of an undertaking such as the one to which we are now giving attention—conditions that would assure it direct and immediate benefits, aside from the even more important indirect benefits derived from the industrial and economic stimulus to the nation.

The President, agreeing in principle with the idea presented in the petition, issued a decree, through the Ministry of Industry and Public Works, naming a commission of four, which was later increased to six, to "study the possibility of establishing a great longitudinal artery for distributing electrical energy in the country, and to propose the bases and general conditions under which such a scheme can be put into effect."

This commission is engaged in making the studies as instructed, but as it is a purely honorary commission, the work is done as a side issue to the regular duties of the members. For this reason the progress has been relatively slow and there is no definite information yet available concerning the findings. The first step has been to investigate the situation regarding the right of way that it will be necessary to obtain for the transmission line. This will have an extension of 1,000 kilometers; and, as nothing of any magnitude has been attempted before, there is practically no legislation providing for handling disputes that may arise when dealing with the owners over whose property the line will pass. It is, therefore, thought of paramount importance to obtain definite and adequate laws covering courts of arbitration, rapid condemnation proceedings, and other details that will insure the enterprise against any unnecessary holdups on this ground, once it is under way. Data, at least of a preliminary nature, have been collected on many of the rivers that would be used for this purpose by individuals who have been trying to form their own companies to furnish the energy for local consumption; and much of this information can be used by the commission when it is ready to start on the technical part of the study.

This enterprise is of interest to capitalists because of the prospect of unusually good returns on the investment and to manufacturers because of the market that it will create for machinery and supplies. This market will include not only the enterprise itself but the many industries and central stations throughout the most progressive section of the country, which will depend upon the new system for a reliable and continuous supply of cheap energy.

AQUEDUCT OF THE INCA.

In 1913 a concession was requested for the construction of works that would furnish drinking water, motive power, and irrigation to the Provinces of Valparaiso, Aconcagua, and Santiago. These works are primarily to supply Valparaiso with abundant drinking water, something that is now lacking in spite of large sums spent by the Government for this same object. It is intended to take water from the Laguna del Inca in the Cordillera of the Andes and carry it in an aqueduct for 200 kilometers to Valparaiso. This Laguna del Inca is situated at an altitude of slightly less than 3,000 meters above sea level, and the power would be generated by taking advantage of the various falls imposed by the nature of the country over which the water would travel before finally reaching its destination at sea level. Although the falls are limited to certain localities, it appears that these are so situated that the power can be sent with small expense to centers where it is needed. No estimate is made of the total force available, but it is pointed out that at the first plant proposed there is a fall of 442 meters, which is sufficient to produce more than 130,000 horsepower. In the region traversed there are already in use motors with a capacity of some 20,000 horsepower, and it is expected that with the coming of cheap electricity many new uses for it will be found. Among the proposed uses are the production of aluminum and calcium carbide on a scale for export, the manufacture of textiles, the refinement and manufacture of copper, and the electrification of the first section of the State Railways and of the Transandine Railway via Juncal. The cost of the entire works, including one or more hydroelectric stations for generating 25,000 kilowatts, which would constitute the first step in power development, was estimated at the time of making up the project at $19,500,000.

The request for the concession is based on certain considerations intended to show the necessity of such a scheme and how it can be carried out. This information leads up to the request, which is addressed to the Congress and reads as follows:

> Based upon these considerations, I solicit from the Sovereign Congress—
>
> (1) The permission necessary for taking from the Laguna del Inca and its hydrographic basin water up to the quantity of 40 cubic meters per second, declaring that this water is to be dedicated exclusively to the service contemplated on the project and in accordance with the present concession.
>
> (2) That the lands over which this aqueduct and its accessory works pass shall be declared to be of public usefulness, whether they belong to municipality, the State, or individuals, and that against the latter there shall be put into practice the statutes of expropriation in conformity with the terms of the law of 1857 bearing on this subject.
>
> (3) The permission necessary for running the transmission lines in accordance with the regulations in force.
>
> (4) Exemption from import duties on all materials imported for the actual execution of this work, it being estimated that said duties would amount to £1,000,000.
>
> (5) The concessionaire must present for the approval of the Supreme Government the general plans of the aqueduct and its accessory works within the space of 18 months after the date of the approval of this concession and must begin working within the year following the approval of the plans, completing it within three years thereafter.
>
> (6) The concessionaire agrees to furnish the drinking water for the towns indicated above and others which may be below the levees of the aqueduct in the proportion which the Supreme Government may deem proper up to a maximum of 500 liters daily per inhabitant.

This water will be delivered to the tanks, which are included in the project, in the towns at the price of 5½ centavos gold [about 2 cents] per cubic meter, this price to apply for 20 years after the works constructed under this concession have been put into service.

(7) The concessionaire agrees to furnish to the Supreme Government the electrical energy which it may need for the electrification of the first section of the State Railways and its branches, shops, etc., at the price of 5 centavos gold per kilowatt-hour, this price also to hold for 20 years after the beginning of operation of these works.

This energy will be furnished at the hydroelectric plants producing it.

(8) The concessionaire is permitted to charge a maximum of 20 centavos gold [7.3 cents] per kilowatt-hour for energy that may be furnished to private persons for use in industries or for lighting and to charge a third of a centavo gold [0.122 cent] per cubic meter of water furnished for irrigation.

The application of these prices is also limited to a period of 20 years after the delivery of the aqueduct to service.

(9) At the expiration of the 20-year period indicated in the previous articles the prices that the concessionaire may apply for these units will be the subject of a special contract between the Supreme Government and the concessionaire, and the tariff that may be applied to private persons can not be more than double that applying to the Government.

(10) The Supreme Government shall not cede to third parties any permission for the execution of an analogous scheme which can serve the zone embraced by this concession until the expiration of the period of 20 years after these works have been put into operation.

(11) The concessionaire can transfer the rights which he may acquire under this concession to the persons or companies that may undertake to obtain the capital necessary for the execution of these works.

In making this transfer it shall remain clearly established that the purchasers must submit to the laws of the nation and that under no circumstances will they enforce their rights through diplomatic proceedings or with the support of another nation.

(12) The Supreme Government may acquire these works at any time, paying for them the price that may be fixed by the experts appointed by common consent, adding to this sum 15 per cent thereof as indemnity.

At the end of 90 years from the date of the delivery of these works to public service, they shall become national property without obligation or payment on the part of the Supreme Government.

LAJA FALLS.

In one of the Government bulletins published in Santiago within the last two years the falls in the Laja River are likened to those of Niagara. While the comparison is not quite warranted it indicates the presence at the Laja Falls of large flow combined with considerable head. As a matter of fact, the head is about 150 feet, divided between two falls, one of 105 and the other of 45 feet. Advantage can be taken of either or both of these falls as conditions require. The river rises in one of the lakes at the foot of the Cordillera of the Andes, which, with little work, can be impounded to increase its capacity several times, thus guaranteeing a continuous supply of water equal to or even greater than the present average flow. These falls are situated in the midst of a fertile agricultural region not many kilometers from several cities, where there is a good deal of manufacturing. All the power generated here would find a market, provided some of the developments now contemplated are carried out. These comprise the establishment of new flour mills and ore smelters and the electrification of the railways in the vicinity. How much of this development it may be possible to complete in the near future it is impossible to predict, but probably not much will be accomplished until the power is available. Thus the industries are waiting for the power and the power scheme is waiting for more industries. To break this temporary deadlock a concession has been applied for in the name of two Chileans resident in that section, one of whom is an engineer of some years' standing. He has made up a proposition which has been sent to the United States, with the object of obtaining financial assistance in forming a company to exploit the concession. There seems every reason to believe that such a scheme would be profitable, although the best results will be obtained some years in the future. The advantage of starting now would consist in being the first to embark on the enterprise in a region where it is a necessity and consequently where it will be established sooner or later.

OTHER HYDROELECTRIC PROJECTS.

Many projects are being worked up and many concessions have been granted for larger or smaller hydroelectric enterprises, but most of them are either founded on false promises regarding the extension of the field that they can cover or else those interested are merely making a business of peddling the concession without any thought of seriously developing it. A few, however, are worth looking into from an investment standpoint. Since it is necessary to foresee a reasonable market for the product of the central station before capital can be attracted to it, the plans frequently include a combination of power and irrigation, because irrigation projects are safe and sure and form a good basis on which to begin even if the irrigation is dropped later. Two of the more important projects now being worked up are for taking power from the Maipo and Mapocho Rivers, and they include plans for irrigation. There is considerable local capital to invest, but the owners much prefer to stick to agriculture, which they understand better, as their own money was probably made in some branch of this industry. It is imperative, therefore, to search for the larger part of the necessary funds outside of the country, and this opens many opportunities for profitable investment. Each project must, of course, be thoroughly investigated. Chile offers an excellent field for the development of hydroelectric power and its use in mining, on the railroads, and for general purposes.

MISCELLANEOUS ITEMS.

BATTERIES.

The four main fields for electric batteries are the operation of telephone and telegraph systems, doorbells, ignition for automobiles, and central-station reserve capacity. For the telephone and telegraph systems practically nothing is used except Leclanché cells, with a sprinkling of Crowfoot and other types. For doorbells, the sal ammoniac cell is the most popular with the householder on account of the low cost of repairs, and with the electrician on account of the frequency with which repairs have to be made. For ignition for automobiles, both dry cells and storage batteries are used, the choice usually depending upon the original equipment of the automobile. Since most of the cars are of the cheaper variety more dry cells are used for this purpose than storage batteries. For the central-station reserve there is nothing but the accumulator or storage battery. Many of the small stations have accumulators, all of the lead plate type and practically all of European make. They are intended for lighting in the daytime or for service after the generators are stopped at about midnight. In Santiago, however, there is storage-battery capacity sufficient to run the tramways for about an hour at normal load. It is divided into sections and located in several of the substations about the city. It is the Tudor type made by a German concern, having been in active service for many years without showing signs of wear more than might be expected under the conditions. It floats on the line continuously, thus helping out on peaks and being ready for taking over the load in any emergency.

Various types and marks of dry cells are offered for sale but the demand is limited and confined almost entirely to Santiago and Valparaiso, other cities not taking even the number that might be expected in proportion to the population. Complaints have been registered against the dry cells on the ground that they arrive in poor condition and nearly discharged so that they are only a short time in service before wearing out. Lately the product seems to have improved or at least is in better shape when it arrives and there is not so much faultfinding as formerly. In price, the cells from the United States have been satisfactory and with the readjustments that are bound to come later they will probably remain so, in which case they will lead the market, such as it is.

There are also a few storage batteries on the railway cars for the lights, but as they form a part of the complete system any new batteries or spare parts are usually bought from the manufacturer or representative of the system. Numerically they are about evenly divided between one English make and two from the United States.

BELLS AND ANNUNCIATORS.

Practically every house is provided with a doorbell, the enameled-iron box being more used than the wooden. Between the different sizes and shapes there is little choice; a large number of the heavier types are used, as the houses are rather large and it is difficult to hear the small ones from a distance. The push button most in favor is one that can be mounted on a flat base with concealed wiring. All the houses are constructed of stone, cement, or similar substance, and the flush-type button goes much better with such material than one that is screwed to the surface and protrudes an inch or more. The push buttons are usually severely plain, at least regarding the plate. Occasionally, when the architecture of the house is ornate, there is a demand for a representation of a flower, lion's head, or other fancy shape. For less pretentious residences the wooden or metal bell of the common form is still sold in large numbers, while for interior use that is practically the only kind used. Pendent buttons, which are much used for servant calls, range from the ordinary pear switch, made of perfectly plain wood, to those made of decorated porcelain.

Annunciators with four to six numbers have a fairly good sale, as many private houses install them to indicate the room from which the call comes. In Chile servants are called upon to do many of the little things that ordinarily are attended to in the United States by members of the household, and bell service in all the principal rooms of a Chilean house is very common.

CARBONS.

Since nearly all the electrical installations are direct-current, there is a constant demand for carbon brushes of various types and sizes. Nearly all are without pigtails, so that to a small extent carbon sheets are carried in stock and brushes are prepared as required. Each manufacturer's agent has a supply of brushes to fit the machines of the make that he represents. This is part of the legitimate business that follows the sale of the larger machinery and apparatus. As the generators are wound for 220/440 volts and the motors for 440, the number of brushes used in proportion to the power installed is very small, and the field offers little attraction to anyone who wishes to sell brushes alone.

Carbons for arc lamps have been so scarce of late that many lamps have been replaced by incandescents. In both Valparaiso and Santiago the illumination originally consisted of series arc lamps and the spare parts, carbons, and new outfits all came from Germany. When there were no more German carbons to be had some were purchased in other countries but did not give good results, apparently because care was not taken to see that they were of the proper quality for the lamps. At any rate there remain only a few arc lamps in Santiago and these will be changed soon, so that the demand for this class of carbons is bound to die out within the near future.

For cinematograph projectors there is a continuous market, as 400 or 500 machines are in operation. Such carbons are usually bought through one of the film-supply houses, of which there are four.

CONDUIT.

The Chilean laws governing electrical installations follow closely those established by European practice and consequently many things are permitted that are contrary to the laws in common use in the United States. One of the most noticeable of these is found in the fact that in houses as well as public buildings or stores, practically all wires are run either on knobs and cleats or in insulating conduit attached, in both cases, to the exterior surface of the walls and ceilings. Very occasionally concealed wiring is employed, in which case the conduit is made of steel, but by far the greater part of it is the "Bergmann tubing" or of that type.

The genuine Bergmann tubing consists of a spirally wound paper tube having walls about one-sixteenth of an inch thick, impregnated with tar or other insulating material, surrounded by a thin sheet of soft brass with edges crimped together lengthwise of the tube but not soldered. This conduit is easily shaped to conform to any irregularities in the surface of the room being wired, the only tools necessary being a jackknife to cut to the proper length and a pair of special bending pliers. One jaw of the pliers is several inches long in a direction perpendicular to the handle and curved in an arc of a circle of large diameter, and the other is hook-shaped with a dull edge, and curved on a diameter slightly larger than that of the tube. In practice the tubing is held by hand in the longer jaw while the other is brought up against it. Then, by a comparatively slight pressure, the dull edge, acting as a lever applied opposite the center of the curved jaw, dents the tube and bends it. By applying the process at intervals of a quarter of an inch or so the bends become continuous, forming a circle of greater or less dimensions according to the desire of the workman. These tubes come in lengths of 3 meters and there are a number of accessories, such as tees and couplings, to facilitate their installation. Wherever the wires are to be joined a junction box must be used, as the tees are permitted only for bringing one side of the line to a switch. Junction boxes of the two, three, or four way varieties are employed, according to the number of circuits required; but they are not used for mounting switches or rosettes, as these are placed directly on the wall or ceiling, as close to the end of the tubing as possible. The accessory most frequently used is the coupling for joining two pieces of conduit.

In addition to the brass tubing there is the type known as "Corona," which is a tin tube painted or varnished to give the appearance of brass; the "tubo plomado," or tin tube with a dipped-lead finish; and the steel tube, with lining of impregnated paper or fiber. A small Chilean shop has brought out recently a tubing made of standard tin sheets soldered together in three parts to make one tube of the usual length, but this has not given satisfactory results, as the material does not bend properly and opens up at the seams.

The normal, or pre-war, price of the real Bergmann tubing was about 15 cents United States gold per length of 3 meters laid down in Santiago. The Corona cost only 11 cents, while the steel cost 40 cents. These prices are so much lower than those of the standard conduit used in the United States that the latter can not possibly compete in places where the former types are perfectly acceptable to both customers and authorities. The field for the American conduit consists entirely of those few jobs of extra high-class wiring where cost is of secondary importance or of the industrial operations carried on by American engineers who keep up to the home standards.

Accompanying this report there have been forwarded one coupling, one tee, one four-way junction box, and one complete length of each type of tubing cut into five sections, so that they can be inspected by any manufacturer interested in the development of this material for South American markets. It should be as cheap as it is possible to make it and at the same time show insulating properties at least as good as the samples. With this latter requirement fulfilled and a price that is reasonable, considering the present conditions, it would be quite possible to build up a good business in all South American countries. In Chile alone there are two dealers who are prepared to give an order at once for upward of 100,000 meters each, most of it in the 11-millimeter size, as the 9-millimeter tubing is used for only one wire instead of a pair.

ELECTRIC AUTOMOBILES.

At present there are no electric automobiles in Chile. One would hardly expect to find them in the smaller cities, where the streets and roads are in poor condition, but in the larger cities, where there are at least fair pavements and few hills, it is strange not to see a few electrics. Conditions in Santiago are especially well adapted to the use of electrics, as the streets are paved with asphalt or well-laid Belgian blocks and there is scarcely any grade. The central station has day circuits, so that facilities for charging the batteries could be arranged easily, either in the home or at one of the garages. The weather is ideal, for it never gets cold enough to do any damage, the lowest officially observed temperature in 65 years having been 26° Fahrenheit. The rainfall is not excessive, averaging only 15 inches. The gasoline-car business is very good and there are many agents, but none have attempted to push the electrics, nor has the electric-lighting company offered any encouragement in this direction. As a matter of fact, the company is still prejudiced against electrics and will not even use one itself.

The roads in the country districts are suitable only for two-wheeled ox carts, and all trucking is done by primitive vehicles of that sort. In the cities the popular delivery wagon also has two wheels but is drawn by horses. Several secondhand automobiles have been equipped with home-made bodies and are now doing light work of this nature, while at one of the mines operated by American capital there are some 5-ton gasoline trucks in operation. These are all the auto trucks in the country, except an occasional truck brought down by one of the large importing houses for demonstration purposes. There is undoubtedly a tendency toward the more widespread adoption of this type of conveyance, and it is possible that the electric car will benefit by the movement; but this can not take place until an active campaign is begun to acquaint the people with what the electric can do. On account of the absence of roads or boulevards in the country the gasoline car does not have the advantageous position with respect to the electric which its long-distance touring radius gives it elsewhere. Nevertheless, the two points in favor of the electric that appeal most strongly to the buying public in the United States, namely, the ease of operation and the cleanliness that appeal to those who drive their own cars, especially women, do not have the same influence in Chile. The owner seldom drives, and it is only within the last year that women have been known to manage cars. One point against the electric is the price, for with the same money, or less, one can buy a much bigger gasoline car. Size is particularly important, both because the large car looks more imposing and because the families are large, as a rule.

The operating cost of an electric would probably work out about the same as that of a gasoline car, as there are no facilities for charging and the price of current is high. In order to be successful in introducing electric vehicles it would be imperative to have a live agent to push them and get some concessions from the lighting company in the matter of special rates for current. The agent would also have to furnish expert help to keep the batteries in good condition; their use is now so restricted that few people understand them. If these few conditions are complied with there should be a fair business in this line.

ELEVATORS AND CRANES.

Except for an occasional installation no elevators are found outside of Santiago and Valparaiso. A majority of the buildings are of two stories or less, anything over three being almost a curiosity. Warehouses are always one story only, so that freight is simply piled as high as is convenient, usually by hand, and there is no opportunity for the sale of elevators specially designed to lift such material. Apartment houses have never been built, but in recent construction this style of dwelling is being approximated, and there may be an increased opening for small elevators with automatic or push-button control. At present the use of elevators is confined to hotels and office buildings, and as very little new building is going on the prospects for elevator business are not any too bright. Competition in this line comes principally from English, Italian, and (formerly) German manufacturers, all of whom have agents among the large machinery houses. One large American company maintains its own representative in Santiago, while another is represented by an American importing firm with headquarters in Santiago and branches or representatives in all the cities of the country.

For machinery of a similar nature, such as mine hoists, freight-piling machines, and wharf cranes, there should be a good demand as the country progresses industrially. There are many cranes along the 2,000 miles of coast line, but the only electric cranes are the half dozen in Mejillones, owned by the Antofagasta & Bolivia Railway Co., and one on the docks at Valparaiso. All the rest are hydraulic or steam cranes. The electric company at Valparaiso charges the same rate for elevator motors as for lights, which is the maximum permitted by governmental regulations, on the ground that the intermittent-load factor increases the demand on their reserve capacity to an unreasonable amount, considering the already overloaded condition of the lines, and that the frequent starting of such motors disturbs the voltage regulation unduly. In other words, motors of this type are considered undesirable and the company discourages their use in that manner.

Mining conditions in Chile itself are not such as to require the use of much hoisting machinery, but many of the Bolivian mines are owned by companies domiciled in Chile, so that purchases are made by them for use outside of the country.

FANS.

The electric fan is one of the conveniences that is being adopted most rapidly. The sales, however, are confined to the few cities where there is a 24-hour service; and, except in the larger cities, the field is almost unexplored. The fact that it is fairly cool at night relieves the situation and makes it very easy to stand the heat of the day, on which account there is not felt the same necessity for artificial means of cooling that there would be otherwise. The central stations also sell the fans; but, although they are exhibited on the counters, they are seldom seen running, and little or no effort is made to move them more rapidly. In Santiago and Valparaiso, however, there are independent dealers who make a business of handling such things and pay more attention to advertisements and demonstrations, with the result that more fans are disposed of. Standard sizes of desk and bracket type are the best sellers, ceiling fans being decidedly in second place. Black finish is satisfactory in the majority of cases, although manufacturers in a position to furnish other finishes without additional cost, would find this feature to be of material assistance in building up their trade. The construction and operation of the fans from the United States are ahead of those from other countries; and, when well introduced and handled by active representatives, the American product will more than hold its own in competition with others. A fan run by alcohol or by kerosene is on the market; but, apparently, it has no market where electricity is available and it can not be called a competitor of the electric fan. A similar type of electric fan would be popular—that is, a cheap fan of about 4 to 6 inches in diameter, for individual use. With few exceptions they should be suitable for 220 volts direct current.

FARM-LIGHTING SETS.

In the many large farms of Chile, most of them located at a considerable distance from any town, the common means of lighting the residences, barns, and grounds is the oil lamp or an acetylene-gas plant. One company does nothing but install and maintain acetylene-gas outfits, and it has apparently done very well, as its equipment is found everywhere, even in some of the smaller towns where there is electricity. Many small water wheels furnish electricity, as every farm is irrigated. It is common to find on a large estate one or two falls that can be used for this purpose. These offer more obstacles to the sale of gasoline or other internal-combustion engine-driven generators on account of the simplicity and low cost of operation. Both of these are important factors, because all fuel is expensive, and the farm hands or peons have no mechanical ability or knowledge of machinery. Up to the present time there have apparently been sold no farm-lighting outfits that combine simplicity with low operating cost, although several have been stocked by the machinery-importing houses, which have expressed great interest in the possibility of building up a business with such a device. If properly pushed by a local house, there should be good prospects for an outfit which to the two qualities mentioned adds the advantage of a low first cost. As there is no way of approaching each farmer or ranch owner, the manufacturer should get in touch with one of the firms handling, or in position to handle, such things in conjunction with an already established machinery business.

FIXTURES.

There is a wide diversity of types and designs in the fixtures displayed in the various stores. The type most approved is the two or four arm of simple design. The droplight or single lamp hung from the ceiling on a flexible cord is still the almost universal light, and it is usually left bare except in the hall or vestibule, where it is provided with a globe of more or less fancy pattern. For the other rooms, especially the parlor and dining room, there is a chandelier in the better houses. In some cities there is a marked preference for simplicity, while in others nothing satisfies except ornamentation, such as cut glass, crystal pendants, and bronze work. Dealers who are pushing fixtures with scientific glass globes and shades or fixtures patterned on the semi-indirect lighting system, claim that they are gaining a stronger hold every day, the commonest installation consisting of the fixture with one high-power gas-filled lamp or with a combination socket and three or more lamps of the ordinary type. Certainly this kind of lighting is becoming more common for stores, clubs, and other semipublic places, but in homes it has been installed only by a few foreigners and the more well-to-do Chileans. In many cities there is, or has been, illuminating gas, but it is now little used except for heating and cooking, and all the gas fixtures have been remodeled and wired for electricity. Combination fixtures are not used, separate ones being employed wherever both are still present in the same building.

Fixtures should be very carefully packed, with the idea of saving freight as well as preventing damage to the goods in transit. If they can be knocked down, so much the better, as any of the large houses has means of mounting them upon arrival. They should be substantial in appearance, as well as strong enough for all practical purposes.

The cheaper fixtures should be arranged to hang from the ceiling, which is always high, by the Bergmann tubing that is much used for wiring purposes. This permits the local workman to furnish his own tube and to cut it to any length desired, whereas when the pipe is sent with the fixture it may be either too long or too short. Moreover, with freight and duty, it costs more than the Bergmann tubing.

Side-wall fixtures are little used, not enough to form an item of great importance. In their place there are sold a number of 45-degree sockets, with either brass or porcelain body, for attaching to the surface of the wall, these answering the purposes of the more expensive brackets.

FLASH LAMPS.

The sale of small hand lamps has greatly increased in the last two years, owing to efforts on the part of the dealers to push them and the improvement in the batteries that are being received. One of the most frequent complaints was that the batteries could not be used, as they were completely wasted before they could be sold, but this is far from true to-day. Nevertheless, the sales seem to be confined to certain localities, notably Santiago and one or two other cities. As far as could be discovered, no well-thought-out propaganda has ever been undertaken in connection with flash lamps or any other line of goods, dealers being content with an occasional announcement in the daily papers and a poorly arranged window display. If the business has increased with such methods, it should increase much more with better ones. Enough of the lamps are in use to demonstrate their practical application in everyday life. People are familiar with them but need the impulse that can come only from the outside to make them buy. The manufacturer should see that the battery is possessed of as long life and as cheap as possible, so that the expense of renewals at the prices that must obtain in Chile is not such as to prevent frequent purchase. Though the batteries have recently improved, their life can not be said to be very long even to-day.

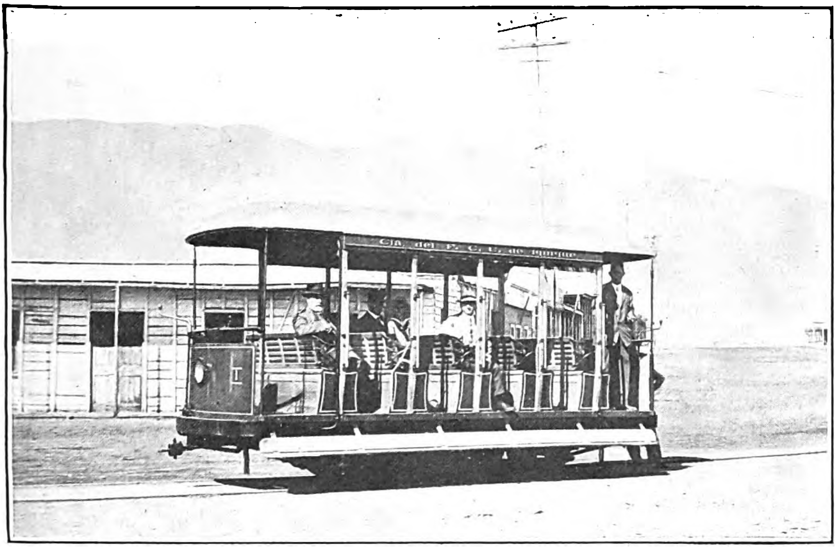

FIG. 19.—STORAGE-BATTERY CAR, IQUIQUE, CHILE.

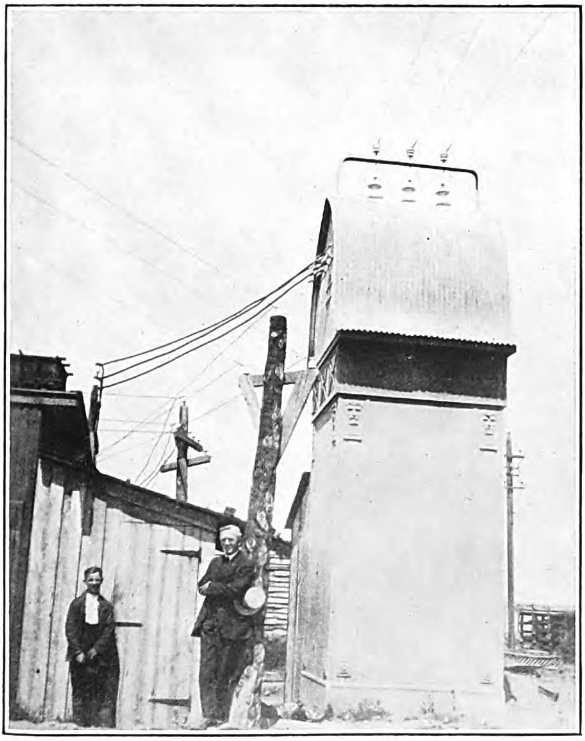

FIG. 20.—TYPE OF TRANSFORMER SUBSTATION USED BY CHILEAN ELECTRIC TRAMWAY AND LIGHT CO. IN SMALL INSTALLATIONS OUTSIDE OF SANTIAGO.

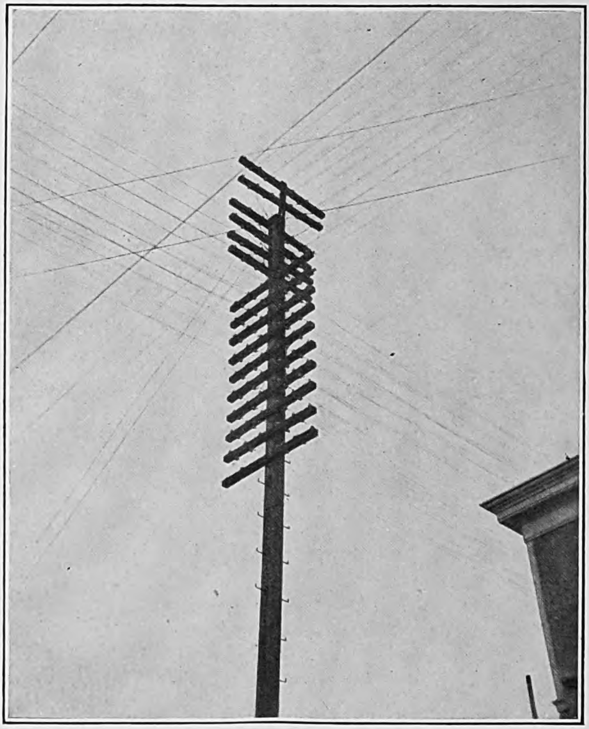

FIG. 21.—TELEPHONE WIRES AT TACNA, CHILE.

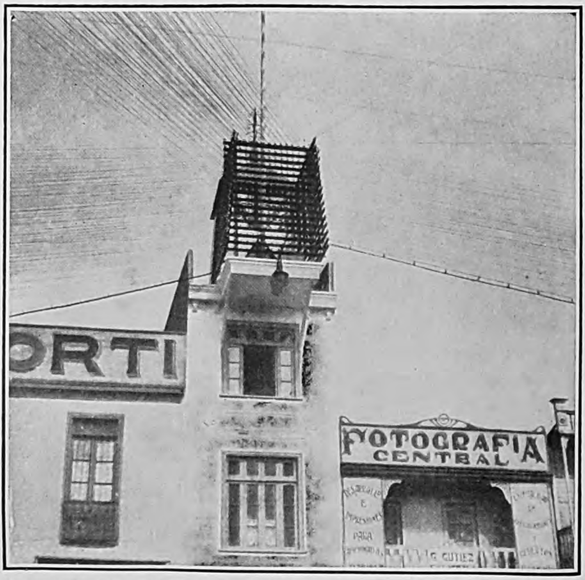

FIG. 22.—TELEPHONE WIRES AT ANTOFAGASTA, CHILE.

FUSES.

The fuse most used is the plug type, with screw base, extra long on account of being for 220-volt circuits. This is strictly a European type, and can not well be replaced by the American types on account of the expense of changing the sockets also. Several American manufacturers have been turning out fuses to fit the European bases, and consequently there is no need to go into details of construction. For circuits of higher voltage some cartridge fuses are used, but more often the bare fuse wire is stretched between screw terminals and protected by porcelain or mica caps. In this case the only market is for the wire itself.

HOUSEHOLD AND OFFICE DEVICES.

Included under the heading of household and office devices are vacuum cleaners, small grinders, polishers, adding machines, and the numerous new devices that are appearing from day to day. Very few of these devices are in use, and the general conservatism of the country and its customs work against their adoption rather than for it. Such office devices as are used are found mostly in foreign business houses and banks.

There should be a good field for vacuum cleaners if it were not for the fact that servants do not cost very much and that most people distrust the servants' ability to handle a thing of that sort without putting it out of order. The houses usually have carpets or rugs, and on account of the mild climate the windows are open much of the time, permitting dust to enter. Cleaning operations are performed with the feather duster and broom or, in the case of polished floors, with a brush or rag, which the servant straps to his foot and scuffs over the surface. Moreover, the price of electricity is so high that a vacuum cleaner is considered a waste of money when the servant's labor probably costs less for the same space of time.

INDUSTRIAL CONTROL MATERIAL.

Although there is considerable manufacturing and the number of motors in use increases steadily, it has not yet arrived at the point where there is any demand for controlling devices apart from the motors themselves. It is true that they wear out from time to time but the dealers usually have a few extra ones on hand and can furnish duplicates. Outside of the mines and one or two of the Government machine shops there are no complicated motor drives and consequently nothing in the line of control other than simple starting boxes. The common circuits for motors are 440 volts direct-current, very little alternating current being found except at the copper and iron mines already described, purchases for which are made through the companies' American offices.

INSULATORS.

There is very little call for high-tension insulators, as the number of transmission lines is limited and they are doing practically no extension work. The company in Santiago, however, has in mind for the near future a prolongation of its 12,000-volt overhead lines throughout the farming district about Santiago. Its present circuits from the hydroelectric plant to the city are all underground. The most notable high-tension line runs from Tocopilla to Chuquicamata, a distance of 100 kilometers. The present voltage is 110,000, but a new line is to be erected to furnish additional power, which will be transmitted at 125,000 volts. These belong to the Chile Exploration Co.

There are other short lines of 5,000 to 30,000 volts, but these run only between near-by points and, except in case of breakage, offer no opportunity for the sale of new insulators. The three following projected developments will require material of this sort, but nothing definite is known of the requirements of the first two, because there is nothing certain about their construction. They have been discussed and will probably be undertaken some day, but not in the immediate future. The schemes mentioned are the electrification of the first and third sections of the Chilean State Railways, the longitudinal artery described earlier in this report, and the new line from Pangal to Coya to be constructed by the Braden Copper Co. The plant for the third project is being put in now and the line will be erected soon, but the material has already been contracted for in New York. All the big companies have used insulators from the United States, but the several small installations have used European insulators, because the whole plant had machinery from the same country and in many cases was put up by mechanics brought over for the purpose. Influence of this sort is too great to overcome without strong organizations that are able to compete on much the same grounds that have given others the advantage up to the present time.

The several telegraph companies offer a fair market for insulators of the special type used, as they frequently extend their wires to new towns or suffer from breakages. They insist upon having only porcelain insulators, claiming that trials with glass insulators have not given good results. This applies particularly to the Government telegraphs, whose wires have an extension of 30,000 kilometers, reaching from Tacna to Punta Arenas. In this distance the lines traverse country that varies from tropical desert to a temperate zone frequently covered with snow and ice. The chief complaints against glass insulators are that they break easily, especially where they are subjected to great changes in temperature, and that they are hygroscopic. Formerly all insulators were supplied by Europe, and once their type was adopted as standard it was impossible to introduce any other against the opposition and prejudice of those in a position to influence purchases, especially after a trial of one lot of glass insulators which failed to give satisfactory service, probably being of very inferior quality. While the conditions in the rest of the country do not seem to be unusually severe, it is undoubtedly true that for the region north of Coquimbo special care should be taken in designing an insulator, with regard to both quality and size. Nearly all of that section is a desert, where the temperature is subject to great fluctuations, rising to a high point in the direct rays of the sun, which shines there every day of the year, and falling rapidly as soon as it sets. The rainfall is practically nil, but the air frequently becomes saturated with moisture, which condenses on the insulators and is absorbed by them if they are hygroscopic. Whether this occurs or not, the dust that is continually blowing about settles on them, forming a saline deposit in combination with the moisture, which reduces their insulating capacity, and causing grounds unless they are built with a large factor of safety against leakage.

For the Government service it has been found desirable to have insulators of different types, according to the places where they are to be used. The insulators for the Government telegraphs are bought by public tenders, but the orders have nearly always gone to a German firm because its prices were lower than those of other bidders. In order to interest the Government in any other type or make it would be necessary to send samples that could be tried out under actual working conditions. After this trial, if they proved satisfactory, bids could be entered whenever called for, on an equal footing with those of other known makes. Without this trial the Government would hardly consider a new design for fear of another disappointing experience, which might jeopardize the service in addition to causing needless trouble and expense. The Government lines are under the charge of the Director General de Telégrafos, Santiago.

In the smaller cities much of the house wiring is done by means of flexible cord, and the insulators for this purpose are one-piece porcelain knobs. In Santiago the cord is permitted only in certain specified locations, and conduit is required nearly everywhere. When conduit is not used the wires are run on two-piece knobs or cleats, but the latter must conform to the dimensions laid down in the rules of the lighting company. These state that all lines mounted on insulators or cleats of porcelain must be separated one from the other at least 5 centimeters. "The distance from the wall shall be 10 millimeters, and in moist places they shall be mounted only on some form of petticoat insulator, maintaining a distance of 50 millimeters between the wire and the wall, and a distance of 80 centimeters between insulators."

LINE MATERIAL.

The number and size of the central stations indicate only a small market for line material. The small plants, which form the majority of those in the country, purchase only in quantities sufficient for their immediate needs, having recourse to the stocks of the importing houses instead of carrying stocks themselves. Once the plant is installed there is no new work aside from the wiring of buildings, as there is practically no growth to the town or the plant. What demand there is, therefore, emanates almost wholly from the American mining companies or the plants in Valparaiso and Santiago. The former buy from the United States and the latter from Germany exclusively. In fact, they were founded largely to exploit German material. The articles employed in line construction do not differ particularly from those made in the United States except that they are of European design. There is nothing new or especially worthy of note about them. For the poles there is in common use a type known as the "Mannesmann." This is a tubular pole made of steel and apparently very durable. It is larger at the bottom than at the top, making one or sometimes two abrupt changes in diameter in its length. Special fittings are necessary in order to use this type, and they are supplied by the house that makes the poles, a German house having representatives in Santiago.

MEDICAL APPARATUS.

In nearly every town there is an X-ray installation, but the use of electrical devices for medical purposes is not general. The profession seems to be passive rather than actively opposed to such devices. In combination with the X-ray machine there are usually other appliances, such as massagers, violet-ray producers, and cabinets for the direct application of current to the body. The X-ray machine is semipublic, in that many doctors take their patients there when treatment of that nature is desired. In this way they avoid the necessity of purchasing such equipment themselves. On account of the few sales that can be made, only one or two dealers have attempted to handle any of the larger devices, and the experience of some of these in trying to obtain customers has not been profitable. Practically the only things that have taken at all well have been the small vibrators and violet-ray machines for home use. There is no regularly organized medical association through which the doctors could be reached by letters or other literature. Consequently, any solicitation of business must be carried on by personal interview, and this can be done only by local representatives.

There are 110 hospitals throughout the Republic, 6 being private and the rest under the charge of the State. The active governing body is known as the Junta de Beneficencia Pública. This body is formed in each Province of the country to look after all public charity and allied subjects in that Province. All members except one or two clerks serve without salary, and the head of each body is the governor of the Province. The affairs of these commissions run in a businesslike manner, finances being disbursed on the annual budget plan. All purchases of new equipment must be foreseen in time to be provided for in the next year's budget, and this in turn must be approved by the department of the Government having supervision over these bodies. This destroys to a certain extent the free right of purchase, but has the advantage common to all budget systems that, once approved, there is no further complication in providing the necessary money. Few of the hospitals have modern equipment, and as they have few funds also they give little promise of being in the market for electrical material.

METERS AND INSTRUMENTS.

Practically all current is sold by meter, and consequently there is a continuous although not large demand for meters of small capacity. These are mostly for 220 volts or three-wire 220–440 volts, direct current. They are installed by the central station and remain its property, although the customer practically pays for them by the rent with which he is charged. The cyclometer dial is not in favor in most places, although the type preferred is similar in that only one figure of each dial shows at a time, and the possibility of confusion in the reading is thus prevented. Meters of different American makes are in common use and prove satisfactory, although expensive. The price is particularly important to the small companies, whose revenue per customer is small, and for that reason a less accurate but cheaper type has a better chance in competition with others on the market. The meter, fuse, and main switch are usually inclosed in a wooden box with a glass plate through which the dials can be seen. Interest has been expressed in the covers and other accessories that would do away with the homemade boxes, but probably the latter are fairly satisfactory, considering both the protection afforded and the cost. One type of meter that has been obtainable only in Europe is arranged to register two rates, one for daytime and the other for night. Even in places where there is only 12-hour service the two-rate meters are used on all motor installations in order to prevent as far as possible the operation of motors during the early hours of the night, when the station capacity is taxed by the lighting load.

Portable instruments are rarely required, as there are no industries to employ them and no one thinks of checking up the motor circuits to see whether or not they are overloaded. All central stations have a more or less complete set of instruments for meter testing, but these rarely include any of the more modern types intended for this purpose only.

MOTORS.

On account of the fact that nearly all power circuits are for 440 volts, direct current, which is not standard in the United States, few manufacturers are in a position to make motors in the small quantities that the market requires at prices that can compete with European makes. This is standard equipment for European manufacturers and any motor can be furnished from stock instead of having to be made up for each order. Since much of the manufacturing is concentrated in and around Valparaiso and Santiago, these places offer the best market for motors of all sizes, but a serious drawback is encountered in the regulations of the central stations in those cities. These specify the speeds of the motors, and any that exceed these are not accepted. The following table gives the maximum speeds of motors of different capacities, in revolutions per minute, full load:

Horsepower.	Voltage.	Revolutions per minute.
½ to 1¾	220	1,700
2 to 2¾	220	1,600
3 to 4¾	440	1,400
5 to 9¾	440	1,300
10 to 19¾	440	1,250
20 to 34¾	440	1,050
35 to 64¾	440	950
65 to 120	440	800

It seems that certain manufacturers can meet these requirements with their standard product and they are therefore the only ones who can supply this demand. The rules are enforced to the letter.

The few alternating-current motors are of the slip-ring type, even in small sizes, as the capacity of the stations is limited and this type offers comparatively little disturbance to the line when starting. The market is hardly worth considering, for aside from the several large mines, it amounts to practically nothing. If the proposed longitudinal artery ever becomes a reality, all the current will be alternating and many of the small central stations will change over in order to take power from the new supply instead of making it themselves. The company in Santiago intends to furnish alternating current to all but the central district, as any further expansion with direct current is impossible with the present load. When this is done there will be some call for induction motors. They will probably have to be of the slip-ring type, as the company, which favors that type, will surely draw up new rules covering this point.

In the mines owned by American capital the motors are bought exclusively from the United States and have to meet only the regular conditions established for domestic production, except where they are intended for some specially severe service. This was not the case with one of the first companies to be electrified, which bought an entire equipment of German motors. The results have not been satisfactory, and the motors will gradually be replaced as the company intends to have only American machinery on its properties.

In the nitrate oficinas practically all the motors are standard types, as the service is not particularly severe. As was pointed out earlier, however, in order to recommend the proper motors it is necessary to make an engineering study of each plant. The requirements differ according to the disposition of the tanks, their capacity, and other elements that enter into the working arrangement. One or two firms make a specialty of this kind of motor application, and it is only through them or the establishment of offices of like nature that this business can be reached.

There are several textile mills, but they are so small that they have never installed special motors for the different machines. Instead the whole mill is driven by one or two large motors belted to line shafting. The results are satisfactory to the owners, and unless they should be repeatedly approached with a well-prepared proposition that would show a saving in their operating costs they would not think of changing. It is estimated that there are 500 looms in all, with the necessary preparatory and finishing machines, located in 7 mills. A new one is being erected in Valparaiso and it will be motor-driven, the material having been ordered from the United States. It will be in part individually driven, and it may have a beneficial influence in demonstrating the superiority of this method over a poorly arranged group drive.

The coal mines are being electrified more and more every year, and whereas hitherto most of the electrical equipment has been kept above ground some of the actual workings are now being done by motors. An American company devoting its energy to the manufacture of mining machinery and making a specialty of types suitable for coal mines has a branch in Santiago, which has been successful in obtaining much of this class of business, in both the purely mechanical and the electrical end. Other American machinery houses have live representatives who are also looking after this field. All the equipment of this sort is American, except what is purchased by companies formed with English capital that insist upon buying in London, specifying English material.

TOYS.

The various attempts to introduce electrical toys have not been successful. The children are not temperamentally inclined toward the adoption of such devices nor is their general education along lines that create a desire for them. A change is slowly taking place with the increased use of electricity in the home and the selection of wiring and contracting as a business by many of the younger generation. In Santiago there is a trade school which has a good course in practical electricity and which is attended by many youths from all parts of the country. Ideas with regard to electricity are thus filtering into the minds of people who never before took any interest in such things and considering the general tendency toward development along mechanical lines, the outlook for a better demand for electrical toys is becoming more promising.

WIRE AND CABLE.

Copper wire is one of the few articles that has a continuous sale in attractive amounts. Various types are required for the different classes of work, both exterior and interior, but the bulk of the business is done with flexible cord and the smaller sizes of insulated wires. Hitherto the American share of this trade has been small, because American wire, although better than that usually sold, did not meet the specifications of the Government nor of the central stations in Santiago and Valparaiso, which are the best markets. The metric system of measurement adopted by them makes it necessary to give all dimensions in square millimeters. The American wire therefore did not meet the specifications, some being over size and others being under. A certain form of insulation, too, is called for and no other is permitted in Santiago, even when of a higher grade. Recently both of these features have been waived temporarily with the understanding that they can be revived at some later date.

The present "Law and Regulating Decrees Relative to Electrical Installations," as issued by the Government, has the following items concerning the wires that may be used:

ART. 62. Conductors must have such cross section and be of such conductivity that a current of twice normal will not elevate the temperature to more than 50 or 60 degrees.

ART. 63. The minimum metallic section admissible for conductors with an insulating covering is fixed at 1 square millimeter. For wiring chandeliers or fixtures this section may be reduced to 0.75 square millimeter.

ART. 66. The minimum section of bare wires run on insulators in interior installations is fixed at 2.5 square millimeters.

ART. 82. In all parts of the branches of the conductors which can be separated from the network of the installation by the functioning of a switch or safety fuse, the resistance of the insulation expressed in ohms, of a conductor with respect to earth or of the conductor of opposite polarity, shall not be numerically less than five times E squared, where E is the voltage of the installation expressed in volts.

ART. 83. In making this resistance test the minimum tension used shall be that of the service of the installation itself.

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ART. 6 (of a later decree). All copper wires must be galvanized, with a covering of vulcanized rubber and a braid of impregnated cotton, so that they will have a resistance to earth of at least 100 megohms.

ART. 7. As an exception to the foregoing, there may be employed an insulation of pure rubber tape with covering of cotton, in case the lines cross below an open ceiling or are run on insulators with a hook.

ART. 11. The minimum cross section permissible for bare conductors shall be 6 square millimeters.

The foregoing are based upon the private rules of the Chilean Electric Tramway & Light Co. (Ltd.), from whose regulations the following have been taken:

Bare wire will not be permitted except for lines connecting lightning arrestors to ground or for the neutral wire in three-wire, 440-volt aerial circuits.

All insulated conductors employed must be of copper, well-tinned, covered with a waterproof layer of vulcanized rubber, and lined with rubberized tape in such a manner that the wire presents a quality equal to the types G. A. of the Siemens-Schuckert or K. V. N. of the Allgemeine Elektricitäts Gesellschaft.

Conductors of the types G. V. or L. L. V. or others similar can not be used, except in the case of aerial lines on petticoat insulators, outside of buildings, and for this service there will be demanded a quality equal to that of the types mentioned.

The cross section of the insulated conductors must be calculated so that the maximum density of current will be in accordance with the following table:

Section in square millimeters.	Amperes.	Section in square millimeters.	Amperes.
0.75	9	10.0	40
1.00	11	16.0	75
1.50	14	25.0	100
2.50	20	35.0	135
4.00	25	50.0	150
6.00	30	70.0	200

The cross section of bare conductors up to 70 square millimeters can be calculated according to the same table. Beyond this limit and in the case of aerial conductors, the load may be calculated on the basis of 2 amperes per square millimeter.

The minimum section permitted in branch circuits shall be 1 square millimeter and for conductors mounted either internally or externally on chandeliers, lamps, or fixtures, ¾ of a square millimeter. Lines inside or outside of buildings or any part of them that may be supported on insulators that are more than 2 meters apart must have a minimum cross section of 4 square millimeters.

The lines between the meter and the distribution board shall be at least 2½ square millimeters and between the connection with the entrance wires and the meter, at least 4 square millimeters.

The minimum section permitted for aerial lines shall be 6 square millimeters.

Aerial lines are all those lines outside of buildings, which are supported on insulators that are 10 meters or more apart.

Installations with flexible cable will not be permitted. The use of cord is allowed only for crossing decorated ceilings and in this case it must run on porcelain insulators or cleats made especially for cord, and the derivation from the line shall be made in porcelain tees with screw terminals. The insulation of the cord shall be of the best quality.

Nothing is said about underground cable, so little of it is used. The only installation of importance is in Santiago, where all the main distribution circuits are run in subterranean conduits throughout the city and 6 three-phase armored cables, run in brick-lined trenches, carry the current from the hydroelectric station at Florida to the substations, a distance of 19 kilometers.

For the aerial circuits bare wire is employed only for transmission lines outside of the towns, insulated wire being, in general, compulsory inside city limits. For this reason and because there is practically no extension of the lines and new ones are not being constructed, the market for such wire is confined to the large central stations. The only field for trolley wire is with the tramway companies of Valparaiso, Santiago, and Concepcion, the first two buying exclusively German wire in normal times and the last American wire through an American exporting house.

The biggest demand is for wire insulated in accordance with the specifications given and having cross sections of 1, 1.5, 2.5, and 4 square millimeters. These are the common sizes used in house wiring, the principal items being the branch circuits of 1 and 1.5 square millimeters. For power circuits the larger sizes are necessary on account of the greater currents carried.

WIRING RULES AND REGULATIONS.

The Government has issued many rules to bind all central stations, but they are not complete. For this reason the department having charge of these things, known as La Inspección Técnica de Empresas e Instalaciones Eléctricas (Bureau of Technical Inspection of Electrical Companies and Installations), under the Ministerio del Interior (Department of the Interior), is revising and remodeling them. They will be based largely on the proceedings recommended by the American Institute of Electrical Engineers, the Board of Underwriters, and similar bodies in the United States. As they stand now they follow the private rules of the lighting company in Santiago, which favor German goods. The result of the new rules will be that American goods can enter the market with much more freedom than formerly.

ENGINEERING SOCIETIES.

There used to be an Association of Electricians in Santiago, but it disbanded for lack of material with which to work and of interest on the part of the members. Another electrical society is the Asociación de Empresas Eléctrical de Chile. This is composed of the different electrical companies, which contribute to the funds necessary for its support in accordance with their generating capacity. The headquarters are in Santiago, where a paid secretary looks after the business affairs, issues the publication, and attends to all routine matters. The object of the association is to see that the interests of the central stations are not overlooked in connection with any Government regulations that are brought up for discussion. For example, recently there was agitation to obtain permission to charge higher rates, and every member of the association applied individually to the Government for a uniform charge in the whole Republic. A yearly meeting of delegates is held in Santiago, when any subject of interest from the standpoint of operation and general welfare is discussed and a program for the following year is laid out.

The engineering society is known as Instituto de Ingenieros de Chile (Chilean Institute of Engineers), with headquarters in its own building at Calle San Martin 352, Santiago. This society is very active, holding frequent meetings and issuing monthly bulletins. This is the seventeenth year of its existence. It has a membership of 440, of whom 21 are corresponding members living in other countries, among them 2 in the United States. There are not over three or four electrical engineers, so the society has little interest in subjects pertaining to that profession.

ENGINEERING SCHOOLS.

Three schools are making a specialty of courses in electricity. Two give theoretical instruction with laboratory practice and the third gives a practical course in operation, construction, and repair of all kinds of machinery and devices. These courses are given, respectively, in the Catholic University, the University of Chile, and the School of Arts and Trades.

The University of Chile is especially well equipped with motors, instruments, and wireless apparatus, with all of which considerable work must be done by each alumnus that takes up the electrical course. This course is under the direction of a practical and consulting engineer of much experience. The equipment is not entirely up to date but will do very well until it can be replaced by something more modern. It is of particular interest to American manufacturers to have more of their machinery in these laboratories so as to make it familiar to the students, who will later be the ones to use or recommend such things in their actual work. Some good would be done by sending catalogues, which would be kept on file and referred to by teachers and pupils alike; they are desirous of keeping abreast of the new developments, even if they can not have samples of everything in their collection.

The School of Arts and Trades gives instruction in many branches of industry. One of the most important is the construction of dynamos, their repair and operation, and general wiring and installation. It is the intention to train not engineers but workmen, who will be able to do intelligently what is now done carelessly by persons of little training or skill. Graduates are always in demand at the mines and central stations, where they have good opportunities to complete their education with well-directed practice. It is highly advantageous to the industry as a whole to have trained assistance to care for the plants and machinery, and reasonable efforts to reach these young men with information regarding American machinery would not be wasted. Many of them have gone to the United States to work in the shops of the manufacturers or on construction jobs, with the idea of returning later to put this knowledge to good use. When they come back they always have a great liking for American ways and material.

The Society of Chilean Students in Foreign Countries and of Foreign Students in Chile (Sociedad por Estudiantes Chilenos en el Estranjero i por Estudiantes Estranjeros en Chile) has done a great deal toward sending students to various countries, especially to the United States, and its object is to augment the number of trained and capable men in engineering and allied professions and trades who can take part in the active development of the wonderful resources of the country. That they should believe the United States the best place to send these young men offers us an opportunity to assist in this movement, which is likewise of great interest and value to us.

The office of the secretary of the society is Instituto Superior de Comercio, Calle Amunátegui 126, Santiago.

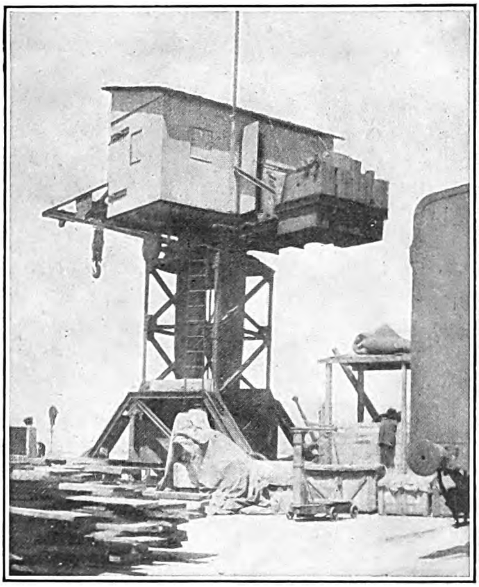

FIG. 23.—ELECTRIC CRANE ON VALPARAISO DOCK.

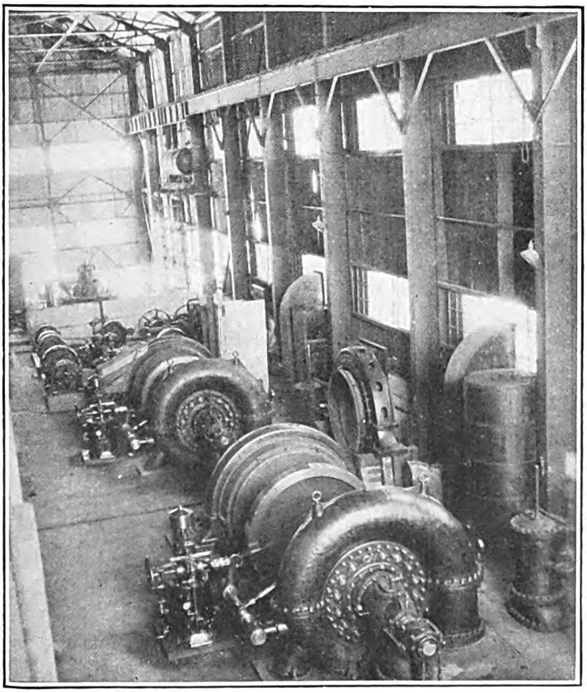

FIG. 24.—INTERIOR OF HYDROELECTRIC PLANT AT COYA, CHILE, WHICH FURNISHES POWER FOR COPPER MINES AT SEWELL, 30 MILES DISTANT.

CONCLUSION: REVIEW OF MARKET.

Of all the countries on the west coast of South America, Chile offers the best opportunity for the immediate sale of electrical goods, either machinery or supplies, and the prospects for the future are still brighter. It is the only country where the natural resources and the will of the people combine to make for progressive development along industrial and manufacturing lines, which means a steadily growing demand for power. This should and will be furnished by harnessing the many waterfalls of the Cordillera of the Andes to electric generators and sending the current to all parts of the central section of the Republic by a comprehensive network which will reduce the cost of energy to a point where it will compare with the lowest in the world. The topography of the country over which the transmission lines would run is favorable to such an enterprise, the distances are not excessive, and with comparatively little work and expense the water can be impounded in many locations so that a continuous average yearly flow can be maintained. The big things contemplated may not be accomplished for years, but they are almost certain of being undertaken in due time. Three projects have already been mentioned that have been the object of preliminary study and are still in a more or less active state, namely, the construction of the longitudinal artery, the electrification of the State Railways, and the establishment of certain branches of the copper, iron, and steel industries that can be carried on successfully with an abundant supply of raw material and cheap electrical power. As raw material is present and power can be developed, there is lacking only the final study to determine the complete feasibility of the scheme before arranging for the capital with which to carry it out. One of the things that should not be overlooked in contemplating Chile as a future commercial field is the opportunity of uniting a safe investment and a profitable business. If early advantage be taken of this situation the relations already existing between the two countries can be strengthened to their mutual profit.

The steady market of to-day consists of the demand for machinery and accessories, incandescent lamps, and wire and wiring devices. These three are the fundamentals of the electrical business and are the most important elements anywhere, especially in a country that has not yet reached an advanced stage of industrial progress. As it approaches this point the sale of the many devices for producing general comfort or efficiency in the everyday life of the people will keep pace and those who are cultivating the field now will be the ones to reap the rewards later on.

REPRESENTATION.

For both the big business and the small, more and better representation of American manufacturers is required. This can best be accomplished by having American houses in Chile. Otherwise Americans must rely upon Europeans to handle their product, something that the latter often do at the same time that they are pushing similar goods from their own countries. If the results are detrimental to one or the other, it is easy to see which will suffer. Apparently the ideal way would be for a combination of factories to support branches, thus obtaining a reduction of the expenses of each and enabling all to meet competition more successfully than heretofore. If Americans can not establish branches of their own houses, the next best thing is to make as strong connections as possible with firms already in Chile. A thorough study of the problems involved in this phase of the situation is recommended, for on the way in which it is solved depends largely the extent of future American participation in this commerce.

The principal competition has been from German houses, the most aggressive of which has a main office in Santiago and branches in Valparaiso, Antofagasta, and Concepcion. In each of these cities its office is on one of the best streets and it combines the office with a well-arranged retail store for the sale of small material. Its staff included several engineers, specialists in certain lines, who were always at the disposal of possible purchasers to make up propositions, give engineering advice, and assist in the erection or operation of plants. This German firm has had the advantage that the large lighting companies in Valparaiso and Santiago bought most of their material from this and one other firm, as all orders are placed by the board of directors in Europe, eliminating any American factory. But a good deal of the rest of the business has gone to this concern for the simple reason that it charged low prices, allowed easy terms of payment, and in general was better equipped to serve its customers. It is impossible to give authoritative data regarding methods, as the business has been practically paralyzed for some time, but that it was successful is evident from the statistics of the Chilean Government for 1913, which show that electrical machinery to the value of $822,879 out of a total of $1,097,128 came from Germany, as against $85,066 from the United States.

CREDITS AND FINANCES.

Since an American bank opened a branch in Chile manufacturers have had ample means of informing themselves regarding the standing of any firm with which they wish to have relations, and to arrange for credits or for financing shipments and handling drafts. As conditions change rapidly, it is undesirable to say anything here except that in general experience has shown that there need be no hesitation in dealing with carefully selected business men and giving them every facility regarding payment for goods. The losses will be negligible, while the exporter, in obtaining their good will, can overcome much of the antagonism that is harbored against those who have insisted upon cash against documents in New York. Many are looking forward to the reappearance of the greater liberality of European houses, which they feel sure will come, even if modified somewhat from that formerly in vogue. It is plainly the best course for the United States to meet this situation by now becoming more liberal voluntarily rather than later to be forced to choose between more liberal terms and a second place in the market.

ADVERTISING—PACKING.

Any advertising directed from the United States is likely to be of little value, as it is usually done with scarcely any knowledge of local conditions. Aside from frequent insertions in magazines of known circulation there is no better way of presenting one's product than by the preparation of attractive literature to be distributed by the representatives in the various cities. Just what forms this shall take depends on many factors, such as the nature of the article, class of trade to be canvassed, and money to be spent. Owing to the conservatism of the people it is necessary to approach them repeatedly before their interest is brought to the buying point; consequently it is better to prepare small quantities of good matter fairly often than to flood the agents with only one circular, which can not be sent more than once to the same person. To supplement this an allowance should be made to meet newspaper advertising expense or to be spent at the discretion of the agent to meet special conditions. This serves to intensify the advertising and increase its effectiveness, as it is possible frequently to take advantage of a historical event or of some unusual happening to focus the attention of the public on an article that bears some relation to the incident. In any case, the subject should be discussed with the agent, whose ideas, based upon his experience in the field, will be invaluable in arriving at the proper conclusions. It is not a question of whether to advertise or not, but of just what mediums to employ to get the most returns for the expenditure.

So much has been written regarding the correct packing methods and the folly of employing others that it seems almost superfluous even to mention the subject. Nevertheless, the facts warrant reiteration of the warning to shippers on this point because day after day goods are arriving in poor condition, even from the largest and foremost manufacturers. The damages are not to be measured by the merely financial part of the transaction but rather by the frame of mind in which the importers are left each time they suffer from carelessness in following instructions or neglect of commonsense rules for export packing. It is hoped that every exporter will examine his methods very carefully and eliminate as many as possible of the causes for complaint.

APPENDIXES.

Appendix A.—SAMPLES.

Six samples of weatherproof wire of German make were transmitted with the report from Bolivia and may be seen at the New York office of the Bureau of Foreign and Domestic Commerce, Room 734, Customhouse. With regard to these samples Special Agent Smith makes the following comment: "The samples of wire sent in with this report are of little value, being very short and without details as to cost; but they are all that could be obtained, as the stocks had been exhausted. They consist of three pieces of weatherproof wire having an insulation impregnated with a red-lead compound and three pieces with only the regular rubber and braid insulation. Both are used out of doors and are reputed to be considerably cheaper than the wire and cable made for the same uses in the United States."

The samples transmitted from Chile consisted of conduit and accessories.

Appendix B.—CATALOGUES AND OTHER PAMPHLETS.

The following pamphlets also may be consulted at the New York Customhouse:

BOLIVIA.

1. Telephone guide of Oruro.
2. Telephone guide of Potosi.
3. Telephone guide of Cochabamba.
4. Tarifas para Luz y Fuerza Eléctrica, Potosi.
5. Apéndice a la Memoria presentada a la Legislatura de 1915.
6. Memoria presentada a la Legislatura de 1916.
7. Apéndice a la Memoria presentada a la Legislatura de 1916.
8. Estudio de la Fuerza Hidráulica de los Ríos Colorado, Blanco, etc.

CHILE.

1. Anuario General de Chile (Annual directory of Chile).
2. Guia de Santiago. (Guide to Santiago.)
3. Telephone directory of Tacna and Arica.
4. Telephone directory of Iquique, Tocopilla, the Pampa, and Pisagua.
5. Telephone directory of Coquimbo and La Serena.
6. Telephone directory of Valparaiso.
7. Telephone directory of Santiago.
8. Telephone directory of Concepcion.
9. Telephone directory of Cia. "Bio-Bio."
10. Memoria de la Empresa Eléctrica de Tacna. (Annual statement.)

11. Memoria de la Cia. de Alumbrado Iquique. (Annual statement.)

12. Memoria de la Cia. de Electricidad Antofagasta. (Annual statement.)

13. Condicionales Generales de la Cia. de Electricidad de Antofagasta para el suministro de Energía eléctrica. (General conditions of the electric company of Antofagasta for the supply of electric energy.)

14. Booklet: "Cia. Alemana Transatlántica de Electricidad."

15. Booklet: "Reglamento de la Chilean Electric Tramway y Light Co. (Ltd.). Santiago, para la Ejecución de Instalaciones eléctricas." (Regulations of the Chilean Electric Tramway & Light Co. (Ltd.), Santiago, for the execution of electrical installations.)

16. Booklet: "Ley y Decretos Reglamentarios relativos á las Instalaciones Electricas," (Law and regulating decrees relative to electrical installations.)

17. List of contractors or installers authorized by the Chilean Electric Tramway & Light Co. (Ltd.).

18. Booklet: "Acqueducto del Inca"—Proyecto para el servicio de agua potable, fuerza motriz, e irrigation de las Provincias de Valparaiso, Aconcagua, y Santiago. (Aqueduct of the Inca—Project for the supply of drinking water, motive power, and irrigation to the Provinces of Valparaiso, Aconcagua, and Santiago.)

19. Leaflet: "Antecedentes relativos al establecimiento de un sistema jeneral de distribución de enerjia eléctrica en toda la rejion central de Chile." (Data relative to the establishment of a general system for distributing electrical energy throughout the central region of Chile.)

20. Booklet: "Lo que podria economizar el erario nacional." (What the national treasury could save.)

21. Booklet: "Estudio sobre la aplicación de la tracción eléctrica en la segunda sección de los Ferrocarriles del Estado." (Study of the application of electric traction in the second section of the State Railways.)

22. Booklet: "3er informe de la Comisión Técnica nombrada por el Supremo Gobierno para resolver las propuestas de Electrificación de las lineas de la Primera Sessión. Informe de Mayoría." (Third report of the Technical Commission named by the Government to analyze the propositions for the electrification of the lines of the First Section. Majority Report.)

23. Booklet: "Las Futuras Maestranzas de los Ferrocarriles." (The future shops of the railways.)

24. Booklet: "Informe sobre la Electrificación de Ferrocarriles en Europa." (Report on the Electrification of Railroads in Europe.) (Report made as a result of a study of the situation in Europe by an engineer sent over by the Chilean Government in 1913 to familiarize himself with developments and be prepared to handle the electrification of the State Railways.)

25. Bulletin of the Institute of Engineers. July, August, September, 1917. (Specimen copies; an article begins in July number, page 324, entitled "Estudio de un proyecto de administración autónoma para el puerto de Valparaiso," or Study of a projected autonomous administration for the Port of Valparaiso.)

26. Bulletin of the Society for Promoting Manufacturing. (Boletin de la Sociedad de Fomento Fabril; specimen copy, contains an interesting article entitled "Las Industrias Fabriles de Chile" (The manufacturing industries of Chile), giving a résumé of conditions and the reasons why Chile is bound to become more and more a manufacturing country.

27. List of members of the Sociedad de Fomento Fabril.

28. Booklet: "Rol de Industriales de la República de Chile" (List of the industrial establishments of the Republic of Chile).

29. Booklet: "Statistical Abstract of the Republic of Chile." In English.

30. Booklet: "Sinópsis Estadística de la República de Chile." (Same as No. 29, but in Spanish.)

31. Booklet: "Anuario Estadístico," Vol. 3—Politica y Administración.

32. Booklet: "Anuario Estadístico," Vol. 7—Agricultura.

33. Booklet: "Anuario Estadístico," Vol. 8—Minería y Metalurgia.

34. Booklet: "Anuario Estadístico," Vol. 9—Industrias.

35. Leaflet: "Sociedad por Estudiantes Chilenos en el Estranjero i por Estudiantes Estranjeros en Chile." (Society in behalf of Chilean students in foreign countries and in behalf of foreign students in Chile.)

36. Full-size drawings showing sizes of porcelain insulators used on telegraph lines.

37. List of articles required by Government telegraph lines.

Appendix C.—TRADE LISTS.

The following lists may be obtained from the Bureau of Foreign and Domestic Commerce or its district or cooperative offices: Bolivia—telephone and telegraph companies, principal mines having power plants, machinery-importing houses, and railways; Chile—central stations, importers of electrical goods, retail electrical-goods stores in Santiago, houses handling cinematograph supplies, contractors or installers authorized by the Chilean Electric Tramway & Light Co., mining companies domiciled in Chile, coal mines, steam railways, shops of the State railways, large automobile dealers, and members of the Government hydroelectric commission. Inquirers should refer to file No. 1333 for Bolivia and 1379 for Chile.

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DEPARTMENT OF COMMERCE
BUREAU OF FOREIGN AND DOMESTIC COMMERCE
B. S. CUTLER, Chief

SPECIAL AGENTS SERIES—No. 168

WEARING APPAREL IN CHILE

BY

W. A. TUCKER
Special Agent

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LETTER OF SUBMITTAL.

Department of Commerce,
Bureau of Foreign and Domestic Commerce,
Washington, May 10, 1918.

Sir: There is submitted herewith a report on the Chilean market for wearing apparel, by W. A. Tucker, a special agent of the Bureau. It represents a portion of the general investigation into the wearing-apparel trade in South America, which in the other countries has been conducted by the commercial attachés. The report discusses the specific requirements of the Chilean market in clothing for men, women, and children, the merchandising methods, and the domestic manufacture. The foreign-trade figures presented show an increase in the American share of the wearing-apparel trade from 3 per cent in 1913 to 11 per cent in 1915; but Germany's share, which was 36 per cent in the normal year, was greater even in 1915 than that of the United States. The Chileans need to know more about American goods if they are not to revert to former buying habits when they are again free to choose. American manufacturers can teach them if they will; and this report, it is hoped, will convince American manufacturers that it is worth while to make the effort.

Respectfully,

B. S. Cutler,
Chief of Bureau.

To Hon. William C. Redfield,
Secretary of Commerce.

WEARING APPAREL IN CHILE.

INTRODUCTION.

The Republic of Chile occupies a long narrow strip of territory lying between the summits of the Andes and the Pacific, extending from latitude 17° 10′ south to 56° south, a total length of some 2,700 miles, with a width varying from 106 to 250 miles. It is bounded on the north by Peru, on the east by Bolivia and Argentina, and on the south and west by the Pacific Ocean. Physically the country is made up of five distinct zones each having its peculiar characteristics, but commercially the separation into three sections according to climatic conditions and density of population will be found to cover the requirements as far as a consideration of the market for wearing apparel is concerned.

The physical conditions vary from the tropical heat of the arid deserts in the north to the perpetually snow-clad peaks of the mountains forming the eastern boundary of the country, the central valleys with extensive areas of well-watered farm lands, the dense forests of the southern portion, and the sparsely inhabited section in the extreme south included in the district of Magallanes, Patagonia, and Tierra del Fuego.

Chile has an area of 289,720 square miles, with a population estimated for 1916 at 3,789,864, the densest in the southern continent, with the exception of Uruguay, the inhabitants per square mile being 13. According to the census of 1907, there were about 100,000 more or less pure-blooded Indians in the Araucanian region and a few hundred aboriginals in the section around the Straits of Magellan, but these are rapidly disappearing. The greater part of the population is made up of Spaniards or people of Spanish descent, with relatively small colonies of Italians, Germans, English, French, Austrians, Swiss, Turks, Americans, and Chinese, the size of the colonies diminishing in the order given. The latest estimate gives the Italians a total of 13,023; Germany, England, and France have about 10,000 each and Austria nearly 4,000; and the United States is next to the end of the list with 1,055.

COMMERCIAL ZONES.

From the commercial point of view the country divides itself into three sections, the first including the arid wastes and the nitrate fields of the north, the second the fertile regions of the central section and the populous districts contiguous to Santiago and Valparaiso, the third, from Concepcion south, taking in the forests of the mainland and the sparsely inhabited portions of Tierra del Fuego and Patagonia.

In the northern section are a few fairly populous coast districts, such as those in the immediate vicinity of Antofagasta and Iquique; the interior is occupied mainly by laborers engaged in the production of nitrate, copper, and borax. Their demands are rather simple, and of the total imports of Chile delivered north of Coquimbo Province the percentages for 1915 were about as follows: Silks of all kinds, 4 per cent; cotton goods, 5 per cent; woolen goods, 8 per cent; and linen goods, 9 per cent. The population of this section is about 10 per cent of the country's total, and the average wage is comparatively high, but living is rather difficult and full service is expected of clothing. From the point of view of the salesman this section is of even less importance than the statement of percentages of the imports would seem to indicate, as many of the houses catering to this trade are simply branches of those located in Santiago or Valparaiso, and the buying is done largely in the main office. The climate is such that few people live there who are not compelled to because of business connections or employment.

The central section is the most densely populated, has a very agreeable climate and the best educational facilities, is the wealthiest section, and has the seat of government at Santiago, the capital city. Three-fourths of the inhabitants are to be found in this section from Coquimbo to Puerto Montt, and at least one-third live in the territory immediately contiguous to Valparaiso and Santiago, the most populous and most important commercial centers of the country. This section also has the majority of the manufacturing establishments, some of the most important copper mines, and the most highly developed farm lands. Its climatic advantages naturally tend to induce those who can afford it to spend the greater part of their time there, and, in addition, the educational and social features are strong attractions.

CLIMATIC CONDITIONS.

The market for wearing apparel is closely dependent on a few prime factors, one of the most important being the climatic conditions in the various sections of the country. On these depend not only the type of clothing required, but also to a less degree the amount purchased during a given period. The peculiar configuration of the country and its extent from north to south result in giving it a greater variety of climate than is usually encountered in a country of its size. To the north there lies a semitropical desert; in the central section a temperate region, with fertile farms and a dense population; and to the south a cold region that has been as yet but slightly developed. Thus it will be seen that the market is much more varied in its requirements than the area and population of the country would seem to indicate.

In the northern section radiation takes places very rapidly, and though the heat during the day is intense, necessitating the use of light garments, sunset brings a very decided drop in the temperature, and heavy garments are required for comfort. There is a constant breeze, and though one feels the heat greatly while exercising in the sun, a parching dryness is experienced on the cessation of exertion. As a result the clothing becomes alternately wet and dry all through the day. The portion of the country lying between Coquimbo and Concepcion requires the use of clothing such as one might expect to find in Georgia, the Carolinas, or Tennessee, though heavier garments are required in the mountainous regions, as deep snows are not at all uncommon.

From Concepcion southward it is very damp, the nights are invariably cold, and the heat is felt only in the three summer months—December, January, and February. The climate is perhaps comparable with that of the American Northwest and British Columbia. The extreme south is negligible in any discussion of the country as a market for wearing apparel; the population not only is small but consists almost entirely of scattered communities of semicivilized aboriginals, who supply their own needs in the way of clothing.

RESOURCES AND INDUSTRIES.

Another prime factor in the market potentialities of any country is the purchasing power of the people, dependent in large measure on the distribution of wealth. In a country where the wealth is concentrated in the hands of a few there is much less opportunity for the wide distribution of any type of merchandise than in a country of the same size and population where the wealth is scattered among a much larger proportion of the inhabitants. This feature naturally leads to a discussion of the sources of wealth—the resources and industries of the country.

By far the greater part of the wealth of Chile consists of the vast deposits of nitrates found in the arid regions of the north, the nitrate industry furnishing employment to over 45,000 wage earners and yielding in export duties just under half of the entire fiscal receipts of the country in 1913. There are large deposits of copper, iron, and other minerals and metals, including salt and borax, which supply gainful employment to perhaps an equal number. The Statistical Abstract (Anuario Estadístico) of Chile for 1916 shows that in 1915 there were in operation 2,406 manufacturing establishments of various kinds, giving employment to 53,000 persons and producing goods to the value of 564,804,507 pesos (paper). These establishments produce many different types of merchandise, though almost half of the total value of the products represents food materials and beverages. [See section on Local Manufacturing for discussion as to the accuracy of these figures.]

Detailed foreign-trade statistics for 1916 are not available, but the résumé published in the Statistical Abstract shows that 72 per cent of the total exports for that year were the products of the mining industries (including nitrate), while the products of forest, stream, and farm swelled the amount to 83 per cent of the total, leaving a relatively small amount for the manufacturing industries. This must not be taken as implying that manufacturing is neglected, but simply as an indication that nearly all the manufactured products are consumed within the country. Manufacturing is still in its early stages, but each year sees additions to plants in operation and it is not at all improbable that the production of many articles now imported will be undertaken in the country within a relatively short time. Among the important industries at present in operation may be cited shoe factories, some of them turning out very creditable merchandise, glass factories, a paper mill, cotton mills, silk mills, woolen mills (which supply the cloths needed for the uniforms of the Army, Navy, railroad employees, and police), corset factories, shirt factories, hosiery and underwear mills, garment factories (in which is made clothing for men, women, and children), furniture shops, foundries and machine shops, distilleries and breweries, canning factories, railroad repair shops, and a long list of other industrial establishments. There is now under construction at San Bernardo, a few miles from Santiago, a locomotive repair shop, and it is expected that a car shop will be erected in the near future and a little later a shop for building locomotives. Industrially the country is making very rapid progress, and it will become more and more independent of foreign countries for its requirements of manufactured goods.

Statesmen who have at heart the best interests of the country realize more and more the importance of fostering the manufacturing industries and are endeavoring to obtain both native and foreign capital for new enterprises that will provide additional means of gainful employment for the people and also be a means of retaining within the country the money paid for manufactured articles. A Government bureau, the Sociedad de Fomento Fabril, has for its prime object the development of local industries of all kinds and has accomplished excellent results in this direction. There is also a school of mechanical arts, where young men are afforded both technical and practical training in architecture, carpentry, and foundry and machine-shop practice. The tariff schedule was devised to foster local production by protective rates on many types of merchandise that are supplied in part by the national establishments, and rates of duty are sufficiently high to prevent the profitable importation of many lines that compete with home products.

IMPORTS OF TEXTILES AND WEARING APPAREL.

During 1915 there were imported into Chile 31,200,000 gold pesos worth of textile materials, divided approximately as follows: Straw, palm, flax, and jute, 7,934,000 pesos; manufactured and raw cotton, threads, etc., 3,653,000 pesos; cotton goods, 12,262,000 pesos; linen goods, 396,000 pesos; woolens, 5,413,000 pesos; and silks, 1,538,000 pesos. The first item consists principally of bags for nitrates, metals, and grains. The second item is principally cotton yarns for knitting and weaving, threads, a small amount of raw cotton, and a fair amount of wiping wastes. The remainder of the imports, amounting to about $7,200,000 United States gold, were distributed as follows: Arica to Coquimbo, inclusive, 6.1 per cent (population, 15.5 per cent); Valparaiso to Concepcion, inclusive, 76.1 per cent (population, 60.7 per cent); and south of Concepcion, 17.8 per cent (population, 23.8 per cent). These figures apply to textiles for personal use but include table linen, bed linen, sailcloth, etc., and also wearing apparel. The imports of wearing apparel alone, with which this report is directly concerned, were as follows:

[The use of an asterisk (*) or dagger (†) in connection with the word "pounds" denotes, respectively, "pounds, including immediate wrapping," and "pounds, net."]

Articles and years.	Total.		United States.	United Kingdom.	Germany.	France.
	Quantity.	Value.				
Belts:						
Cotton—						
1913........pounds*	2,341	$5,749	$195	$1,316	$2,398	$1,300
1914........do	2,079	3,591	81	316	2,679	494
1915........do	825	1,091	....	396	657	38
Leather—						
1913........do	3,891	8,025	136	1,910	3,428	2,553
1914........do	3,373	7,586	409	1,461	4,007	1,359
1915........do	1,089	2,133	422	1,233	68	376
Blankets, ponchos, and scarfs:						
Cotton—						
1913........pounds†	14,945	10,306	....	2,054	7,704	....
1914........do	3,051	2,038	....	454	1,478	....
1915........do	1,085	748	....	436	309	....
Wool—						
1913........do	24,767	31,317	....	4,425	19,618	1,090
1914........do	6,305	7,630	....	1,496	3,150	....
1915........do	1,493	2,247	12	493	14	76
Caps:						
Cotton—						
1913........	....	8,907	....	3,908	2,371	1,847
1914........	....	6,287	....	2,117	2,068	1,735
1915........	....	3,015	401	1,479	86	664
Silk—						
1913........	....	8,492	....	5,050	899	2,313
1914........	....	5,601	....	3,371	279	1,757
1915........	....	2,508	....	1,645	307	436
Wool—						
1913........	....	44,636	....	23,117	11,710	5,364
1914........	....	28,320	26	16,690	6,961	1,668
1915........	....	8,843	495	6,828	574	442
Clothing:						
Cotton—						
For men and boys—						
1913........pounds†	94,168	78,453	10,333	30,726	23,035	11,798
1914........do	53,888	46,692	9,725	19,445	12,260	2,553
1915........do	50,272	42,843	22,605	10,091	3,384	1,328
For women and girls—						
Cut but not sewed—						
1913........do	6,847	11,753	666	....	5,349	5,285
1914........do	1,349	1,728	340	....	814	574
1915........do	3,212	3,837	1,014	896	417	1,455
Ready-made—						
1913........do	144,969	172,196	245	44,362	56,632	68,281
1914........do	61,079	81,439	901	17,548	23,839	35,778
1915........do	28,000	35,295	3,553	11,431	7,592	9,825
Knit—						
1913........pounds*	9,323	9,783	....	1,534	6,887	778
1914........do	8,933	10,408	....	1,162	7,386	1,260
1915........do	4,280	5,002	174	2,026	266	1,182
Waterproof—						
Sewed—						
1913........pounds†	3,650	6,044	1,270	2,895	1,314	....
1914........do	5,247	8,687	190	6,179	1,311	1,007
1915........do	2,612	4,325	15	3,687	336	....
Not sewed—						
1913........do	9,330	15,446	15	9,026	5,289	....
1914........do	1,984	3,285	387	1,428	1,070	....
1915........do	1,087	1,800	106	1,603	....	....
Linen—						
Suits and garments—						
1913........do	6,978	10,954	49	2,364	1,960	5,505
1914........do	996	1,835	3	175	181	1,101
1915........do	593	988	3	217	90	671
White—						
1913........pounds*	5,366	11,229	....	7,614	1,920	1,405
1914........do	3,106	6,944	41	1,251	2,732	2,611
1915........do	1,171	2,267	161	688	82	891
Silk, for women and girls—						
Cut but not sewed—						
1913........pounds†	1,270	5,972	2,043	....	....	2,928
1914........do	141	1,354	....	29	91	576
1915........do	105	736	....	129	....	600
Ready-made—						
1913........do	22,203	222,297	....	31,599	38,691	144,311
1914........do	14,619	150,712	335	26,788	20,763	98,929
1915........do	5,412	63,169	1,075	18,886	1,807	32,889
Wool—						
Cut but not sewed—						
1913........do	39,143	30,866	....	3,443	527	26,551
1914........do	12,557	9,962	....	1,718	47	8,158
1915........do	5,549	4,417	....	65	....	4,352

Articles and years.	Total.		United States.	United Kingdom.	Germany.	France.
	Quantity.	*Value.*				
Clothing—Continued.						
Woolen—Continued.						
For men and boys—						
1913 .... do....	150,092	$208,756	$804	$116,500	$59,296	$26,756
1914 .... do....	111,635	160,479	2,197	86,636	52,322	15,505
1915 .... do....	68,606	94,168	4,940	65,097	8,834	3,710
For women and girls—						
1913 .... do....	141,848	324,048	110	66,668	80,972	168,097
1914 .... do....	98,661	208,493	132	30,822	69,156	107,883
1915 .... do....	27,908	62,026	1,687	21,412	14,730	20,890
Knit—						
1913 .... do....	26,638	43,445	219	11,010	20,204	8,902
1914 .... do....	32,380	56,838	180	16,355	26,830	10,677
1915 .... do....	6,750	11,363	722	6,166	1,490	2,641
Waterproof, sewed and not sewed—						
1913 .... pounds†..	2,992	5,944	101	3,438	1,616	788
1914 .... do....	3,613	7,179	48	4,043	2,497	477
1915 .... do....	1,477	2,935	9	2,488	96	92
Collars and cuffs:						
Celluloid—						
1914 .... pounds*..	10,157	16,816	241	6,070	10,308	197
1915 .... do....	3,323	5,501	135	3,161	1,241	964
Cotton—						
1913 .... dozens..	16,346	23,308	1,407	9,671	6,289	7,062
1914 .... do....	12,478	18,692	2,724	8,491	3,670	3,159
1915 .... do....	8,596	13,052	2,049	4,835	2,433	2,728
Linen—						
1913 .... do....	19,208	29,353	825	19,936	5,228	3,087
1914 .... do....	14,640	22,311	366	17,443	2,870	1,371
1915 .... do....	8,110	12,580	826	10,551	673	523
Corsets and underwaists, cotton:						
1913 .... number..	33,880	27,348	4,333	6,822	5,405	9,826
1914 .... do....	25,239	20,377	5,751	2,170	1,684	8,374
1915 .... do....	10,072	7,907	1,718	2,788	235	2,353
Footwear:						
Boots and shoes—						
For infants—						
1913 .... dozens..	10,028	65,989	2,026	38,666	12,109	11,139
1914 .... do....	6,681	44,174	1,669	26,800	3,322	10,129
1915 .... do....	3,153	21,666	145	11,917	1,169	7,466
For men—						
1913 .... pairs..	36,602	95,072	22,130	41,832	23,906	3,860
1914 .... do....	45,010	133,943	82,894	36,079	11,259	2,828
1915 .... do....	17,950	57,737	39,147	12,009	5,444	546
For women—						
1913 .... do....	49,485	92,274	23,756	16,026	39,118	7,870
1914 .... do....	38,329	73,127	33,476	9,775	15,979	8,673
1915 .... do....	18,614	35,550	16,528	5,608	6,722	4,460
For children—						
1913 .... do....	33,486	37,656	2,252	22,707	7,815	2,633
1914 .... do....	31,057	34,387	5,114	17,650	6,507	3,820
1915 .... do....	11,722	12,949	1,117	8,684	1,765	496
Low-cut sport shoes with rubber soles—						
1913 .... pounds†..	9,706	12,857	967	8,693	2,742	345
1914 .... do....	9,486	12,565	1,317	10,267	584	336
1915 .... do....	5,134	6,801	666	4,080	596	1,367
Overshoes—						
1913 .... pounds*..	98,941	65,523	21,675	7,510	32,660	3,324
1914 .... do....	54,642	36,186	8,687	3,806	21,249	2,431
1915 .... do....	23,662	15,670	13,330	1,050	1,041	101
Sandals, leather, for children and infants—						
1913 .... dozens..	1,924	14,962	867	8,248	2,067	3,022
1914 .... do....	829	6,144	1,113	3,193	637	276
1915 .... do....	596	4,467	356	1,911	983	223
Slippers, low-cut leather shoes, and alpargatas, cheap—						
1913	....	28,900	3,151	4,912	10,545	2,332
1914	....	19,852	....	4,564	7,385	5,256
1915	....	9,215	1,004	1,886	782	911
Gloves and half gloves:						
Cotton—						
1913	....	40,797	....	2,830	31,376	6,410
1914	....	27,874	460	3,101	21,940	2,052
1915	....	7,646	187	916	2,011	3,866
Leather—						
1913	....	38,426	866	9,576	7,735	19,736
1914	....	36,308	4,874	13,705	5,324	11,292
1915	....	12,743	2,613	5,645	402	4,033
Silk—						
1913	....	9,361	....	929	6,802	1,102
1914	....	4,971	....	1,131	2,997	625
1915	....	2,415	380	27	698	759

Articles and years.	Total.		United States.	United Kingdom.	Germany.	France.
	Quantity.	*Value.*				
Handkerchiefs:						
Cotton—						
1913....................poundst..	290,240	$241,852	$428	$211,854	$20,634	$5,993
1914....................do....	140,051	117,516	715	102,481	8,166	4,285
1915....................do....	94,512	77,739	....	68,047	2,530	6,083
Linen—						
1913....................do....	7,491	15,611	....	8,595	3,034	3,373
1914....................do....	3,862	8,044	11	4,773	793	2,171
1915....................do....	3,322	6,758	63	4,692	170	1,352
Silk—						
1913....................do....	6,740	61,613	37	13,006	12,885	12,251
1914....................do....	3,239	28,331	147	4,410	10,647	1,871
1915....................do....	1,140	10,212	58	2,947	1,201	356
Hat shapes:						
1913....................do....	106,150	211,078	....	293	28,919	384
1914....................do....	44,060	81,012	92	114	25,678	7,398
1915....................do....	64,229	127,642	....	117	11,401	26
Hats:						
Chip, straw, etc.—						
For men and boys—						
1913....................	....	168,268	778	43,980	19,818	50,137
1914....................	....	95,286	128	31,543	9,720	26,342
1915....................	....	79,117	125	26,232	2,847	11,439
For women and girls—						
1913....................number..	92,912	66,973	68	10,786	12,294	39,827
1914....................do....	78,029	54,395	1	11,064	9,645	31,648
1915....................do....	14,827	12,433	207	2,475	479	9,142
Cotton—						
For men and boys—						
1913....................dozens..	2,293	10,043	....	3,443	1,322	4,341
1914....................do....	1,068	4,790	....	1,778	751	1,899
1915....................do....	902	4,056	131	2,111	8	1,770
For women and girls—						
1913....................do....	940	5,272	....	1,698	406	3,115
1914....................do....	964	5,925	31	1,723	163	3,999
1915....................do....	574	2,524	....	1,279	....	1,112
Silk—						
For men and boys—						
1913....................number..	3,297	8,532	....	2,570	860	4,722
1914....................do....	1,835	4,808	....	2,613	91	1,972
1915....................do....	471	1,161	38	654	47	414
For women and girls—						
1913....................do....	14,749	48,903	....	6,382	1,207	38,991
1914....................do....	18,514	60,580	4	10,650	1,006	47,944
1915....................do....	4,878	17,711	4	4,082	....	13,417
Wool—						
For men and boys—						
1913....................do....	554,364	441,477	1,932	70,261	91,734	31,531
1914....................do....	350,496	315,990	....	53,867	50,994	24,927
1915....................do....	154,299	149,025	2,475	17,103	10,397	6,640
For women and girls—						
1913....................do....	32,512	26,331	....	4,236	4,509	14,924
1914....................do....	18,125	15,958	....	2,050	3,193	9,658
1915....................do....	6,285	4,462	1	210	193	2,109
Mantos, woolen:						
1913....................poundst..	4,998	9,929	....	3,845	2,203	3,119
1914....................do....	2,198	4,366	....	478	289	3,447
1915....................do....	1,305	2,593	....	162	....	2,431
Neckties, silk:						
1913....................pounds*..	10,133	50,328	5	19,272	11,330	17,740
1914....................do....	5,659	28,113	684	12,707	5,161	4,119
1915....................do....	2,992	14,859	215	6,849	716	2,066
Shawls and scarfs:						
Cotton—						
1913....................poundst..	50,080	25,815	15	1,637	15,025	73
1914....................do....	23,411	11,861	....	713	10,128	333
1915....................do....	8,331	4,144	....	262	2,170	....
Silk—						
1913....................do....	6,294	56,338	....	9,145	10,609	17,174
1914....................do....	3,368	33,142	186	4,547	5,814	10,107
1915....................do....	1,631	16,664	....	7,567	46	3,595
Wool—						
1913....................do....	324,606	321,659	166	16,663	237,279	5,135
1914....................do....	106,360	109,373	....	7,888	78,069	4,883
1915....................do....	42,055	41,707	31	3,772	22,702	979
Shirts, men's:						
Cotton—						
1913....................number..	74,066	55,650	3,601	18,748	16,630	14,413
1914....................do....	42,811	33,454	4,509	8,499	9,286	9,441
1915....................do....	20,491	15,159	2,590	5,784	2,133	1,864
Linen—						
1913....................do....	4,403	9,643	....	5,917	2,966	760
1914....................do....	5,055	11,070	1,363	8,563	664	480
1915....................do....	1,432	3,137	....	2,598	14	....

Articles and years.	Total.		United States.	United Kingdom	Germany.	France.
	Quantity.	*Value.*				
Socks:						
Silk—						
1913..........pounds†..	591	$5,859	$1,876	....	$1,600	$1,170
1914..........do....	591	5,871	1,996	$371	1,567	990
1915..........do....	604	6,006	638	1,760	268	1,654
Wool—						
1913..........pounds*..	44,066	43,538	15	29,215	10,119	3,366
1914..........do....	35,496	35,822	337	26,693	7,336	1,241
1915..........do....	10,113	10,617	257	9,129	339	276
Socks, stockings, drawers, undershirts, etc., cotton, knit:						
1913..........pounds*..	953,107	825,684	33,414	91,570	588,465	34,188
1914..........do....	617,945	557,228	56,973	49,491	363,706	34,995
1915..........do....	237,910	211,913	29,117	28,460	69,637	15,722
Stockings:						
Silk—						
1913..........do....	1,303	12,947	5,431	3,941	1,509	1,521
1914..........do....	584	5,806	408	825	1,808	2,717
1915..........do....	847	8,405	3,108	1,554	296	2,465
Wool—						
1913..........do....	28,861	29,094	141	17,424	8,805	1,107
1914..........do....	25,419	25,836	1,287	15,718	6,332	1,816
1915..........do....	5,452	6,239	88	4,617	848	329
Suspenders and garters:						
Cotton—						
1913..........do....	49,957	65,153	10,539	11,636	30,867	7,095
1914..........do....	31,694	41,666	11,569	6,141	15,075	2,998
1915..........do....	13,000	17,824	4,585	3,431	3,110	3,612
Silk—						
1913..........do....	505	2,814	193	1,129	438	885
1914..........do....	642	4,057	645	900	594	1,304
1915..........do....	463	2,728	395	627	169	1,264
Underclothing, exclusive of knit goods:						
Cotton—						
1913..........pounds*..	19,928	30,937	66	7,144	15,093	6,229
1914..........do....	26,244	42,232	2.534	6,528	13,196	18,071
1915..........do....	8,007	10,333	3,247	3,145	452	3,344
Wool—						
1913..........pounds†..	1,184	2,037	18	1,171	721	127
1914..........pounds*..	5,972	6,347	2,296	2,147	1,610	237
1915..........do....	1,089	1,883	495	1,316	18	54
Underclothing, knit, wool:						
1913..........do....	31,158	127,198	1,034	38,313	71,100	10,021
1914..........do....	75,958	113,981	3,261	43,556	53,709	7,901
1915..........do....	16,757	25,789	1,191	20,024	2,222	1,287
Veils:						
1913..........pounds†..	619	12,297	....	574	4,896	5,667
1914..........do....	331	6,572	39	1,294	337	4,842
1915..........do....	229	4,538	....	2,608	186	1,671
All other articles:						
1913..........	....	78,586	3,103	22,184	23,548	21,815
1914..........	....	61,869	2,018	14,146	17,843	13,846
1915..........	....	33,534	2,490	9,821	4,020	5,021
Total:						
1913..........	....	4,927,903	163,301	1,247,949	1,796,442	928,794
1914..........	....	3,256,116	254,915	842,000	1,071,007	642,853
1915..........	....	1,512,567	168,784	476,255	206,241	214,848

The Chilean trade in ready-to-wear dresses is overwhelmingly dominated by the Parisian costumers, or at least was prior to the disruption of trade resulting from war conditions, the imports from France amounting to more than 50 per cent of the total in woolen and 65 per cent of the total in silk clothing and nearly 40 per cent of the cotton garments. Germany's dominance of the wearing-apparel trade as a whole is the result of the large imports of knit goods and shawls from that country. The United States, in which the ready-to-wear garment trade has reached its highest state of development, supplies a very small portion of the requirements of Chile. In 1914 and 1915 the American share of the trade increased considerably, but unfortunately this was not because of the facilities afforded the Chilean merchant to purchase his supplies in the United

States, but in spite of obstacles. Anyone who has made a careful study of the Chilean requirements and has sufficient familiarity with the products of American factories and workshops to make an intelligent comparison of prices and values can not fail to be convinced that there is abundant opportunity to increase American trade in textiles and wearing apparel, not only in Chile but in the other west-coast countries. Failure to take advantage of this opportunity must be attributed to neglect on the part of American exporters and manufacturers and to the use of business methods that would not be tolerated in the trade in the United States. It is not the higher cost of American goods, deficiency in style or fit, or inferiority in either workmanship or quality that is responsible for the poor showing made by the United States in the trade with Chile, but solely the lack of progressive, aggressive, intelligently directed sales campaigns and failure to cooperate to the fullest extent with the local merchants.

MARKET REQUIREMENTS.

The variation in climate between different sections of the country requires the use of garments of practically all types and weights. In the north the days are very hot, so that tropicals are logical fabrics if comfort is to be considered; in the central section, with its more nearly temperate climate, the summer season requires the use of lightweight clothing, while in the cooler months the accepted type of men's wear cloths is the same as that used in the United States, woolens of 14 to 16 ounces per yard or even heavier if one's employment necessitates remaining out of doors the greater part of the time. Owing to the lack of heating apparatus in the houses of even the wealthier class, probably more heavy weights are sold in proportion than would be marketed in the United States.

MEN'S WEAR.

In clothes for civilian wear worsteds seem to be much more popular than woolens. In the windows of the stores catering to the ready-made clothing trade of the better class, worsted suits predominate in the ratio of 2 to 1 or thereabouts. Possibly this is due to the fact that there is no possibility of mistaking such a suit for one made of locally manufactured materials, or it may be because of the clear-cut designs obtainable in this fabric, which can not be approximated in a cloth made of carded yarns. No little attention is paid to dress in the larger towns and the cities, so that there is a larger market for clothing than would be expected in a country with so small a population. As is the case in most countries, the well-to-do classes invariably have their clothes made by the better-class tailors, the greater number of the business men, clerks, and other employees patronizing cheaper tailors and the ready-made goods being purchased only by the less prosperous.

The ready-made clothing trade has not assumed anything like the proportions it has attained in the United States, nor is there any probability that it will do so in the near future, though each year sees a slightly larger volume of business transacted. One of the prime reasons for this conclusion is that the cost of a tailored suit is very little more than that charged for a ready-made suit of the same quality of goods, and the fit is decidedly superior. The clothing manufacturer has not attained the degree of efficiency in style, fit, and workmanship that is typical of the large American manufacturing clothiers, and the result of his efforts leaves much to be desired.

The relatively small imports of men's ready-made clothing are supplied almost entirely by European makers, the purchasers preferring the styles turned out by them to the smarter garments made by American manufacturers. This is due in large measure to the fact that the importers of clothing, who are also the distributers of the merchandise, are without exception Europeans and naturally turn to their home countries for the types of garments to which they have been accustomed. Another factor that has militated against the sale of American clothing is the fact that a persistent attempt has never been made to enter the market. A glance at the table of imports by principal articles and principal countries shows a remarkable increase in the percentage of men's woolen wearing apparel purchased from the United States in the years 1914 and 1915 as compared with 1913, the last normal year, but too much encouragement should not be taken from these figures. The share of the trade increased from 0.385 per cent in the earlier year, when the total imports amounted to $208,756, to 5.25 per cent in 1915, with total imports only $94,168. There was thus an increase in the American share of the trade of 1,250 per cent, a gain that should satisfy the most ardent trade expansionists; but when reduced to a dollar basis the gain is 614 per cent of the earlier year's business, which represented clothing sufficient to satisfy the needs of 16 men, allowing them two moderate-priced suits a year but no overcoat. Such a showing as this made by the country in which the ready-to-wear clothing industry has reached a higher stage of development than in any other in the world is certainly far from satisfactory.

Whether or not a sufficient trade in American clothing could be obtained to warrant the expense connected with propaganda work is a question that requires no little study. At first glance it would seem as if the extremely high rate of duty would alone be effective in keeping out any considerable volume of apparel; but when one takes into consideration the lack of style and fit of the clothing turned out by the local manufacturers and the exorbitant prices charged by tailors able to make a suit that a man with any pride in his personal appearance would be willing to wear, the market looks more promising. It is only by making comparison of prices, quality, fit, and style that any intelligent conclusion can be reached relative to the possibility of increasing the sale in the Chilean market of men's wear made by American manufacturers.

QUALITIES AND STYLES IN DEMAND.

By far the greater part of the clothing worn by the men is similar in grade to that found in American moderate-priced clothing stores—

suits that could be purchased prior to the war for $16.50 to $25. In addition, there are marketed a goodly number of suits such as the lower-priced stores in any American city retailed at $10 to $15. These find purchasers among the workers and others who have very little to spend on clothing.

Approximately one-fourth of the male population wear ready-made clothing. The aristocracy and a part of the middle class patronize the tailors, while the lower classes have their clothing made in their homes by the women of the family. The quantity of clothing imported gives a very slight impression of the extent of the market, as the greater part of the requirements of the country is supplied by the domestic manufacturers. The domestic industry has not developed along the same lines as in the United States, where the great factories turn out suits by the thousand and distribute them by means of jobbers or direct to the retail trade. In Chile the manufacturer is in most instances the retailer also, and the clothing industry is by no means a wholesale proposition, few of the makers selling any clothing except in their own retail stores.

The sales of sack suits are much larger than those of any other style in ready-made goods, the annual sales probably amounting to as much in number of suits, if not in value, as those of all other styles combined. The styles in order of volume marketed are about as follows: Cutaway, frock, evening, and tuxedo. For business wear the sack suit is generally used by all classes. The well to do possibly change to the cutaway for afternoon or evening wear, unless they intend to go out, when the tuxedo or evening dress is worn. The tuxedo is used in many cases when evening clothes would be considered more appropriate in the United States. The middle class, smaller business men, clerks, etc., use the tuxedo or the cutaway almost exclusively for the more formal occasions, and the frock coat is less commonly used than in the United States.

FABRICS EMPLOYED.

Inspection of the lines carried by the retailers would indicate that for the better-class trade worsteds are much more salable than the soft-finished woolens. It is possible to obtain in such cloths the finer, clear-cut designs that show the individual colors and the small weave effects distinctly. Moreover, the locally made cloths are all woolens, and the wearer of a worsted suit is confident that no one will mistake his suit for one made of domestic fabrics. There exists no little prejudice against the cloths made in the country, much of which is entirely without foundation; many of the local products are of high order, though as a general thing they lack the style and finish of the imported goods. Samples of locally made goods, when subjected to critical inspection, are found to be more or less imperfect, and without visiting the mills to gain first-hand information as to the methods of manufacture and the efficiency of the labor one can form a fairly good idea of the organization from the results obtained. Many of the cloths are well constructed, made of excellent raw materials, and fairly well woven, but poorly finished.

No data are available as to the proportion of the different cloths imported, nor is any distinction made in the statistics between the various types of cloth, except those containing an admixture of silk. In any case information with regard to the predominant fabric would not be of permanent value, as it is likely that the vagaries of fashion in regard to cloths are more or less prevalent here as in all other countries, and any conclusions drawn would be subject to drastic modification.

Examination of the stocks in the stores and tailor shops indicates that the present season's popular cloths are the worsteds in rather small, neat effects, mixtures, and serges, a large proportion of the serges in blacks. In order of importance the cloths would run as follows: Fancy worsteds, serges, solid mixtures, unfinished fancy worsteds, and unfinished black worsteds for formal suits. In woolen goods the types in order of importance are as follows: Cassimeres, cheviots, and saxonies for suitings, and meltons, cheviots, and twills for overcoatings. Lightweight overcoats for fall and spring wear are usually made of a sort of flannel-finished twill in solid black or blue or a gray mixture, the prevailing shade for the present season being a white and black mixture of about 5 and 95 per cent or 10 and 90. Oxford mixtures are worn to some extent. Clear-finished goods are much more popular than those with any perceptible amount of nap. Flannels are used, as in the United States, for summer wear at the beach, outing purposes, or sports but are not a large item in the total consumption.

Solid colors are very popular, and the suits displayed by the majority of dealers are inclined to the conservative in color and design rather than to the conspicuous. Most of the suits seen in the windows of the dealers are made up of cloths in neat, dark-colored checks, possibly with an overplaid of subdued color that blends well with the ground of the pattern, or of solid colors or a single mixture. This is especially true of worsteds. In woolen goods greater variety is noticeable in the patterns and, as is usually the case, there is a tendency toward bolder effects and stronger colorings, which are modified to some degree by the nature of the goods and the finish. Stripes are rarely used for suitings but are used for trouserings in combination with the cutaway or the frock coat.

MEASUREMENTS AND SIZES.

The metric system is used universally for sizes, and the basis of suit sizes is the waist measure, which is estimated as 4 centimeters less than the chest. The standard waist measurements for ready-made suits are 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, and 60 centimeters, the length of the coat is 70 to 82 centimeters, and of sleeves 76 to 86 centimeters. The vests range from 60 to 76 centimeters in length and the trousers from 78 to 86 centimeters, measured on the inner seam. The sizes most in demand are 40 to 48 waist measure. A good idea of the proportion of the different sizes required may be gained from the following table showing an order to the manufacturing department for 20 sack coats. The sizes are in centimeters (1 centimeter=0.3937 inch):

Sleeve measure.	Waist measure.											
	38	40	42	44	46	48	50	52	54	56	58	60
76	1	....	....	1	....	....	....	....	....	....	....	....
78	....	1	1	....	1	1	1	....	1	....	....	1
82	....	1	....	1	1	1	....	1	....	1	1	....
84	....	....	1	1	1	....	1	....	....	....	....	....

The foregoing order sheet is typical of the ordinary manufacturing order; the longest sleeve (86) is omitted and there is a single suit of each of the extreme waist sizes. The longest sleeve is ordered in perhaps one of 50 suits. Those familiar with the clothing industry will readily perceive that the sizes are considerably smaller than would be required in the regular assortment for an American retailer. The following table shows the combination of sizes (expressed in centimeters) in regular use by one of the largest manufacturers in the country and will serve as a guide to any American clothiers who care to make an attempt to enter the Chilean market:

Waist measure.	Coat.	Sleeve.	Vest.	Trousers.	Waist measure.	Coat.	Sleeve.	Vest.	Trousers.
38	70	76	60	78	48	74	80	68	82
	72	78	62	80		76	82	70	84
	74	80	62	82		78	84	70	86
	76	82	62	84		80	86	70	86
40	70	76	62	78	50	76	80	68	80
	72	78	62	80		78	82	70	82
	74	80	62	82		80	84	70	82
	76	82	64	84	52	78	82	70	80
42	72	78	64	80		80	84	70	82
	74	80	64	82		82	86	72	84
	76	82	64	84	54	78	82	72	80
44	72	78	64	80		82	86	72	84
	74	80	64	82	56	80	84	74	82
	76	82	66	84	58	82	86	74	84
	78	84	66	86	60	80	84	76	82
46	74	80	66	82					
	76	82	68	84					
	78	84	68	86					
	80	86	68	86					

The reduction of the foregoing measurements from centimeters to inches will enable a manufacturer to determine readily how closely his regular sizes follow the market requirements and how much change will be necessary to adapt his goods to the needs of the Chilean retailer.

PROSPECTIVE MARKET FOR READY-MADE SUITS.

Doubtless it would require some time and effort to overcome the popular prejudice against ready-made clothing in the minds of many of the potential customers; but on the other hand it would seem entirely feasible to introduce some well-known American brands of advertised goods and build up a very satisfactory business. The American goods are greatly superior to anything turned out by the local manufacturers and to the imports from Europe, and have better style and fit than 80 per cent of the suits tailored to order in the highest-class shops of the largest cities. After seeing the type of clothing displayed by even the better-class stores one can readily agree with the statement made by the head of the tailoring department of one of the most important manufacturers in the country that the style and workmanship of the locally made clothes leave much to be desired. One of the greatest obstacles to the importation of ready-made clothing is the duty, amounting on woolen clothing to 7 pesos gold per kilo ($2.55 per 2.2 pounds). A second obstacle is the inclination to place prices very high on every piece of merchandise, particularly foreign goods.

The motto " large sales and small profits " has no place in the lexicon of the Chilean merchant. In conversation with one of the leading merchants the statement was made that a certain article showed a profit of 125 per cent net—not a specialty but a regular line of underwear. A similar condition of affairs, possibly not so extreme, is found in the clothing trade.

Probably the import duties would make it impractical to bring in the cheaper classes of goods, but in the finer lines there is an opportunity for developing more or less trade. Naturally this division of the market is somewhat restricted, as there is less demand for high-grade clothing than for the lower-priced lines; but on the other hand there would be much less competition from the local manufacturer and the added advantage of the dislike of the more well to do for the locally made product. The disinclination to purchase these garments would be readily understood if one could see them in use.

To overcome the heavy duties assessed on made-up apparel a considerable quantity is imported simply cut, paying in this condition less than one-third of the duty on completed garments. The suits are packaged singly, each bundle containing the linings and trimmings even to the buttons, and the clothing is sewed in the shops or sent to the homes of the sewing women. In either case the standard of workmanship is far from high, and the style and fit of the finished garments are not at all desirable.

GARMENT STYLES AND PRICES.

Changes in the prevailing fashions in European countries are watched closely by the tailors, most of whom, especially the cutters in the better-class shops, are foreign-born, and the latest pattern sheets are to be seen prominently displayed in the shop windows. Many shops advertise that they have English or French cutters, giving the impression that this necessarily implies a better fitting suit; needless to say, it also implies a high price. Some of the tailored suits are excellently made and show considerable skill in the cutting and adaptation of the style to the customers' special requirements, but the smaller shops, as is the case in many other countries, frequently fail to produce satisfactory suits. Accepting the estimate of one of the oldest members of the manufacturing fraternity that about one-fourth of the male inhabitants of the country wear ready-made clothes, it would seem that there should be abundant opportunity to increase the trade if an intelligently directed campaign is instituted with this end in view.

The ordinary type of sack suit sold by the ready-made trade varies in price from 70 to 130 pesos ($21 to $39) for a suit with regular trimmings and lining, depending on the quality of the fabric. The suit forwarded with this report is one that sold at 91 pesos gold ($33) in June, 1917, a price much higher than would have been asked for a similar suit in the majority of American stores. A cutaway suit with ordinary lining costs from $50 to $65, and with silk lining $10 to $15 more. A frock or an evening suit, silk-lined, sells for $65 or more, and a tuxedo for $62.50 or more, according to the quality of the material.

The tailored suits of the same kinds are much more expensive, a sack suit costing $55 to $75, with $10 extra for a silk lining; a cutaway suit costs $85 to $100, a frock about $115, an evening suit $125, and a tuxedo $95. The highest-priced cutaway and the formal clothes all have silk linings. These prices are not quoted as the high limit, but are the cost of clothes made to measure by the ordinary tailor. If one wishes to obtain the same materials made up by a fashionable tailor in any of the larger cities the prices are much higher. It was possible to buy suits much better tailored and of fully as good materials in any American cities of about the same size for 25 to 35 per cent less, and the fit and style of the American suits are far superior.

TWO-PIECE SUITS—FANCY VESTS.

Among the better class there seems to be a decided disinclination to appear in public without a vest; even in the extreme heat of summer most of the men of the middle and upper classes wear three-piece suits. But the members of the foreign colonies, particularly the Americans and English, follow the dictates of comfort rather than style in this matter, and their example is being followed more and more every year. At present a few of the natives wear two-piece suits. Occasionally one sees a man dressed in a suit consisting of a cheviot or cassimere coat and trousers of fancy worsted, but this is by no means common. The approved combination appears to be a black or blue coat, possibly of alpaca, with trousers of either worsted or white flannel. Goods of the palm-beach order, which one would expect to find generally worn in so warm a climate, are practically unknown, the few suits seen being those brought from home by some returning vacation visitor. To one accustomed to the climate of the northern United States it is a constant source of wonder how the people here can support the warm clothing worn constantly. On evenings when the temperature is such that a light overcoat is hardly required it is common to find the men on the streets enveloped in heavy overcoats with mufflers around the neck and pulled up over the mouth and nose. The women also wear the mufflers.

Fancy vests are worn much more than in most parts of the United States, there being no time, day or night, winter or summer, when they are not seen. They are worn with all sorts of costumes, sack coats, cutaway, frock, evening clothes, or with the tuxedo. All kinds of fabrics are employed in their manufacture (woolens, worsteds, cottons, and silks), and they are made in various styles of both single and double breasted types. White vests are popular, piqué probably being the most popular fabric for those to be worn with the less formal clothes and holding about equal favor with brocaded silk for dress occasions. For ordinary wear the fancy vest is of wool or worsted goods in silk spot effects or colored designs and is usually fancy cut. Solid colors (light tans and browns) are also used to a considerable extent, and striped piqués are shown by most of the clothing houses.

OVERCOATS.

There is a limited demand for overcoats during the spring and fall seasons, the majority of the men wearing their winter coats until the season has advanced sufficiently in spring to permit going without an outer coat, and putting on the heavy coat rather early in the fall. The well to do have a lightweight topcoat for use during the summer evenings or the chilly days of spring and fall, but they are not in such general use as to make their importation worth much effort. The cloth used for their manufacture is generally a medium-weight woolen in a half melton or flannel finish, or an undressed worsted. The color is usually black or a dark-gray mixture, and the price from $35 to $45 for the regular lines such as American clothiers offered in the spring of 1914 for $12.50 to $20. A finer line is carried, silk-faced and partly silk-lined, selling at $45 to $60, coats similar to those sold in American clothing stores for $20 to $35.

There is a sale for a relatively small number of cheviot coats in more pronounced patterns, cut in the English style, and usually somewhat longer than the regular coat, worn for traveling. In the present season the prevailing style for such garments seems to be the raglan or the balmacaan model.

Winter overcoats form one of the most salable items in the stock of the clothier. It is essential that the assortment should be varied and well selected in styles and fabrics as well as in prices. The leading dealers say that four to six classes should be carried in stock, the lowest-priced line from $12.50 to $16.50, another line up to $30, the others ranging about $35, $40, and $45, and the best line $55 or higher. The lower-priced coats are made with linings of alpaca, serge, or other woolen material and the highest-priced line invariably is silk-lined. These are made of a wide variety of cloths, though dark colors or mixtures are far more popular than the fancy cloths. The styles follow the English styles very closely. The best-selling sizes are 42 to 56 centimeters in chest measure, with sleeves 76 to 84 centimeters, and 100 to 110 centimeters long. The raglan model is much affected in a half-lined coat, which is used as a raincoat or for traveling and is made very full. Dark gray is the leading color in all but the raglan model. Black overcoats are much worn, and three grades should be carried in stock—the cheapest at about $25, the next at about $35 to $40, and the best at $50 to $60. The highest-priced coat has a silk lining.

In addition to these overcoats, the leading stores usually carry two lines of garments made of montagnac or similar material, generally in dark blue, the lower-priced line selling at about $45 and the better coat with silk lining selling at approximately $70. The goods used in these so-called montagnac coats are seldom the cloth that is known by that name in the American market, but are more frequently any of the rougher cloths, such as shetland, chinchilla, or possibly crêpon.

WINTER CLOTHING.

The clothing worn in the winter season differs little from the summer goods except in the weight of fabric and the prevalence of slightly darker colors. The favorite weights are 16 to 20 ounces per yard. The styles are much the same, with the possible exception that the double-breasted coat is more in favor. Worsteds are affected by most people, though woolens are more prominent in the window displays than in the warmer season. Fancy vests for the winter season are in good demand, made of heavier goods than those for summer wear and usually of woolens and worsteds, silk spot effects, natty plaids, and a few stripes. The complete absence of stripes in suitings for both summer and winter wear is noticeable; even the pencil stripes found little favor, according to the reports of tailors and ready-made clothing dealers, in the seasons when they were worn generally in the United States.

WORK CLOTHES.

The greater part of the "rotos," as the Chilean laborers are termed, are not in the habit of wearing special work clothes and the overall is conspicuously absent. The only place where it can be found is among the "gringos" at the mines; it is not for sale generally in the stores outside of the mining centers. Most of the mines operate a sort of commissary where the employees can supply their needs, and in these stores an American overall is the best known. The laborers usually wear clothing made of casinete or brin where the weather is warm enough to permit the use of cotton clothing, and these suits are made in the country. One or two establishments specialize to some extent on workingmen's clothes and the rate of duty is so high on ready-to-wear goods that competition from outside the country is impossible. During the warmer weather the roto wears nothing but undershirt and trousers, the latter a nondescript garment with but little attempt made at fit and usually so dirty that it would require no little skill to determine the original pattern of the goods. House servants of the poorer class are dressed to some extent in the cast-off clothing of their employers and in addition there is quite a business in secondhand clothing. Many of the poorer people have their clothing made by the women of the household, buying for this purpose corduroy or other durable material, khaki or brin, fancy drill, or cottonade.

A considerable business is done in separate trousers, but most of this is in the hands of the pawnbrokers, the majority of whom carry on a mercantile business in connection with their loan offices. In fact, in Santiago and Valparaiso most of the low-priced clothing is sold by pawnbrokers. To obtain any considerable share of the business in cheap trousers it would be necessary to get out a special line, cut on a model entirely distinct from that in use in the United States, higher in the waist, with wide waistband, fastened with three buttons, and it is not at all probable that a sufficient distribution could be obtained to warrant the expense. There seems to be no special preference as to patterns, some of the trousers being made of stripes and others of checked material, but the prevailing color is gray. The goods are made of twist or mock twist yarns, colored yarns and black filling, or blends of black and white for the warp and black fillings, the ordinary type of goods such as are turned out by many American mills. Several concerns manufacture these goods for the trade, the cottonade trousers selling at the factory for 90 pesos per dozen and the corduroy at 120 pesos (about $27 and $36), retailing at prices ranging from 10 to 12 pesos for the cottonades to 15 and 18 pesos for the corduroys ($3 to $3.60 and $4.50 to $5.40). Much better trousers could be bought in the United States for $1.50 and $3.50 in the spring of 1916 and probably can be purchased to-day at much lower figures than are quoted in Santiago. The profits on ready-made goods at both wholesale and retail are very large.

HUNTING AND RIDING CLOTHES.

Sportsmen's clothing is not an important item in the ready-made clothing trade, nor do the custom tailors make up a large number of suits for hunting or fishing. These suits are generally made of some colored material, many of them of khaki or other fabric calculated to show dirt and stains but little. They invariably consist of two pieces, a loose-fitting coat with close collar, and knee breeches with which leggings are worn. The majority of the coats are similar to those in general use by American sportsmen, with side pockets and game receptacles or pockets in the lining, or between the lining and the shell. They are usually made up with bone buttons containing a figure of a rabbit or the head of a dog as ornament. The suits sell at about $40.

The small number of railroads and the absence of good carriage roads in many parts of the Republic have made excellent horsemen of most of the Chileans, as travel in many cases must be on horseback. In any city or town more horsemen may be seen in a day than would be seen in most American cities east of the Mississippi in six months, so that riding clothes are in much greater demand than in the United States. These are two-piece suits, the coat either with closed collar or with lapels (the latter style predominating) and in Norfolk model, with the belt of the same material as the garment. Cheviots and cassimeres are used for these garments more than other cloths, though worsteds are used to some extent by those who ride for pleasure or exercise. Those whose business requires them to be in the saddle much of the time wear suits of Bedford cord, or "borlon," as the fabric is here designated, or breeches of this cloth with coat of a less clumsy material. In not a few instances riding suits are made of a finely woven cotton fabric that is resistant to water and to the thorns and twigs encountered in riding through the country. This fabric was imported from England and is very scarce at present.

UNIFORMS.

The possibility of supplying any great portion of the requirements for uniforms by makers outside of the country is extremely remote. Several concerns in Santiago have furnished them under contract for a number of years and it would be very difficult for an outside concern to compete with them under the present rate of duty.

Sales of uniform cloths to be made up by the local contractors are practically nil, nor is there any probability that the custom of buying these goods abroad will be revived to any extent after the war. One of the contractors expressed himself as eager to obtain samples and prices from the United States, while another manufacturer stated that motives of patriotism and the importance of fostering the national industry would compel him to sacrifice a portion of his profits, if need be, rather than to purchase his goods outside of the country in order to meet competition.

Most of the goods used by the police and railroads are four-harness twills, well-felted and with a semimelton finish, not napped nor so closely finished as are American cloths made for uniform purposes. For riding breeches a Bedford cord is made, called "borlon," in a color approximating the feldgrau, formerly imported from Germany. This weighs 800 grams per meter and was bought at 14 pesos per meter.

Uniforms for the conductors and trainmen of the national railways are made of a so-called serge, in a color considerably darker than olive drab, having as a portion of the mixture a dark bottle green. This weighs 600 grams per meter and costs 9 pesos per meter. The overcoatings for these men are made of a similar cloth weighing 700 grams and costing 13 pesos. All the prices mentioned in connection with these cloths are in paper pesos, worth, at the time of writing, about 30 cents American gold.

CARRIAGE AND AUTOMOBILE LIVERY—HOUSEHOLD LIVERY.

Uniforms are worn much more generally in Chile than in the United States. Business houses and private families always uniform their porters and hall boys, and it seems that every one wears a uniform who can find an excuse for so doing. The sale of uniforms and livery is therefore one of the most important branches of the clothing trade, both in the ready-to-wear goods and in tailored garments. Each type of carriage requires a different style of livery for its driver and a change of type for winter and summer. For the closed carriage the accepted type of coachman's livery for the entire year is made with a double-breasted sack coat, long trousers, and cap with glazed visor. Nearly all of these are in dark blue or dark bottle green, with trimmings to match those of the coach, usually bright red or yellow. The double-breasted coat has metal buttons, which are brass if the trimmings of the coach are yellow, and white metal if they are not. The collar and cuffs are piped with material of the color of the coach trimmings, as are the cuffs. The outside seams of the trousers also are welted with the same color. Another popular type of livery for the coach is made with a coat fastened by frogs instead of buttons. This style omits the color in the coat, the trousers only having the piping. For this coach no overcoat is worn in winter, the coachman having as protection from the weather a blue robe lined with a heavy flannel and a shawl for the shoulders and body.

For the victoria the livery consists of a silk hat with a cockade, frock coat, single-breasted, with buttons of brass or white metal, according to the color of the carriage trimmings, and a velvet collar above, which shows a narrow strip of yellow, yellow and blue, or black and red in about quarter-inch stripes. The knee breeches are either white moleskin or a cream-colored woolen in imitation of leather. This livery is completed with patent-leather top boots, the tops of celluloid and usually white. These two liveries are made of meltons, but for summer wear the victoria livery is made of a lead-colored serge throughout without trimmings. The overcoats are made in two models, both double-breasted, one with metal buttons and the other fastening with frogs, usually with astrakhan collar and cuffs. The length of these coats is 125 to 140 centimeters. Prices of the overcoats vary from $55 for the buttoned garment to $70 for the coat with frogs and astrakhan trimmings. The liveries cost $30 to $35 for the coach livery with buttons and $7.50 more for the suits with frogs. The price of the livery for the victoria is $40 to $45 for the coat, $10 to $15 for the cotton breeches, about $5 more for those of wool, and $22 for the boots, with $7.50 to $10 more for the celluloid tops.

The number of automobiles in Chile is increasing very rapidly and with them the demand for livery suitable for chauffeurs. Relatively few of these are imported, however, aside from the models, as the purchaser frequently requires some change to suit his particular fancy. For this reason the greater number are made to measure. The fabrics generally employed are on the castor or melton order, navy blue or dark green for the most part, with a lesser number made of black and white or dark brown and white mixtures. One of the favorite mixtures is a dark slate, or "plomo" (lead), and white, which is considered in good taste with a machine of any color. Two types are generally used—suits with long trousers and those with knee breeches. With the latter the chauffeur wears leather leggings or puttees of the same material as the trousers. These liveries are all two-piece and sell at $40 to $60.

The overcoats to accompany these suits are of material similar in color but heavier in weight and are cut very full and long. The collar is made so that it can be worn open or with the lapels turned up to button close to the neck, forming a close-fitting chevalier style, about 10 centimeters high, with a tab to button across the throat to keep the collar in position. These coats are double-breasted, with two rows of buttons. The buttons are large, and frequently are adorned with the figure of an auto; the center of the button is dark, and there is a ring of white or yellow metal as a border. The coats are 125 to 140 centimeters long and are sold at $40 to $55. There is a limited demand for astrakhan collars and cuffs to accompany these coats, costing $8 to $10 per set and fastening to the garment with snap fasteners. For summer wear there is a good sale for washable suits made along the same lines, the favorite fabric being khaki or a solid-colored drill, or "brin," as the fancy drills are termed. Over the suit it is customary to wear a dust coat of tan cotton with a double collar and dust band in the wrist, held in place with an elastic. The washable suits sell at $20 to $30, and the dust coats at $15 for the plainer style or $20 with double collar and wrist protector.

Practically every family that is at all well-to-do has a number of men and women servants. The men servants generally wear livery, the styles following the English fashions closely. The footman wears a double-breasted, high-cut tail coat with brass buttons, and trousers with piping of red. The butler's dress is the regulation tail coat, low-cut, with low-cut vest, usually in black unfinished worsted or lightweight melton fabric. Many of the private families dress the serving men in khaki livery for the summer season, and this also is piped with red around the collar, the cuffs, and the side seams of the trousers.

TAILORING.

Most of the tailoring establishments purchase suit lengths without duplicates in fancy goods and plain fabrics by the piece or half piece, according to the amount of business done. Overcoatings are purchased in the same way, single coat lengths of the fancy goods and the plain styles by the piece. Odd trouserings are bought in lengths, a tailor seldom purchasing more than one pattern of each style. An idea of the profits made in this branch of the business may be gained from the following prices charged for sack-coat suits of various materials: Made of goods costing $1.40 to $1.80 per meter, $50 to $60; made of goods costing $2.40 to $3 per meter, $65 to $75; made of goods costing $3 to $3.50 per meter, $75 to $90. The cutaway suit is usually made of an unfinished worsted and costs $70 to $85 with ordinary linings, or $13 more if lined with silk. A frock or Prince Albert suit costs $80 to $100 with ordinary lining and $13 to $15 more with silk lining. Tuxedo and evening suits cost $100 and $115, respectively. An overcoat made of an ordinary fabric costs $65 to $75 with ordinary lining, $15 more with silk lining, and an additional $15 if faced with silk. Fancy vests cost $15 to $20, and piqué vests $12 to $15; silk vests cost $20 to $25. Trousers made of fancy worsteds cost $12 to $15 and knee breeches up to $30. Knee breeches of brin or khaki cost $15 to $18. A suit of linen drill sells for $40 to $50. Fancy worsteds are much more popular than woolens of any sort, the latter being used for the lower-priced suits. The linings are generally alpaca, invariably so in the summer because they are cooler.

The cost of making the clothes is entirely out of proportion to the prices charged. For making a single-breasted sack suit the tailor is paid 18 to 20 pesos ($5.40 to $6), and for a double-breasted coat 20 to 22 pesos ($6 to $6.60); for a cutaway coat 28 pesos ($8.40), or if silk-lined, 30 pesos ($9). For making a tuxedo the price is 28 pesos ($8.40), and for a frock coat or evening coat 35 pesos ($10.50); trousers 4.50 to 5.50 pesos ($1.35 to $1.65); vest 4 to 5 pesos ($1.20 to $1.50); knee breeches 11 pesos ($3.30); and overcoat 28 to 32 pesos ($8.40 to $9.60). The rates given are those charged by the first-class shops. The rates of the smaller and second-rate shops are correspondingly less. The margin of profit is much greater than that obtained by similar establishments in American cities.

FURNISHINGS.

There are relatively few stores engaged in the furnishing trade, aside from those operated by the manufacturers of shirts, collars, cuffs, and neckwear, as outlets for the products of their manufacturing establishments. There are several of these, located in Santiago and Valparaiso; some employ over 300 operatives and others have a much smaller number. One of the most important has five stores in Santiago, one in Valparaiso, and one in Talca. All these stores sell a general line of haberdashery, but chiefly shirts, collars, cuffs, and neckwear, and are known as "camiserías," or shirt stores. In the factory shirts, collars, cuffs, drawers, nightgowns, neckwear, undershirts, and garters are made, all from imported materials. These stores, as well as most of the other camiserías, sell knit underwear and hosiery, though they do not manufacture these articles.

The concern mentioned sells to the entire Chilean territory by means of a corps of traveling salesmen. The factory employs 200 women and girls and has a total of 300 employees, but in normal times the working force is nearly 600. Twenty men are employed in the cutting room and are paid by the week; the women and girls operating the sewing machines, etc., are all piece workers. The factory property, with the manager's house attached, is valued at 300,000 pesos. It is generally considered that such a business can not be operated successfully except by the owner. The manager of this shop includes in his duties cost finding, purchasing of raw materials, merchandising of the finished product, direct supervision of the production of the factory, and the financial management. The only assistant in all this work seems to be a bookkeeper. The estimated consumption of the factory at present is about 2,000,000 yards of white and colored goods annually.

The machinery is operated by a 60-horsepower gas engine, with an auxiliary 30-horsepower steam engine used in the morning for the steam laundry work. The machinery is of English, German, and American origin and does not appear to be in the best of condition. A considerable amortization fund is available for the purchase of new machinery, but the manager states that he has been deterred from ordering because of the poor condition in which some machinery had been received from the United States. One marking machine in particular, which had been purchased as new, showed unmistakable signs of wear and was so badly battered as to be unserviceable. The manager plans to go to the United States to purchase machinery and will supervise the packing so as to assure its arrival in good condition. The laundry is equipped with washing machines, centrifugal extractors, and American mangles and ironing machines.

For shipping within the country the cases are made of half-inch stock, with reinforced corners and triple-bound with slats and iron bands, so that the goods reach their destination in extremely good order. Formerly nearly all the fabrics used were the products of European mills, mainly those of England, France, and Germany, with a few from Spain; but since the war has rendered deliveries problematical, more goods have been purchased in the United States and the manager appears quite enthusiastic over the possibility of the United States gaining and keeping a much larger share of the trade.

STYLES AND QUALITIES OF SHIRTS.

There is at least as much variation in the styles of shirts shown by the leading makers in Chile as in the United States, aside from the complete absence of the coat shirt, which seems to gain no foothold in any of the west-coast countries. The better classes wear very largely shirts made with stiff bosoms and attached cuffs of some fancy material on a white body. It would appear, however, that this prevalence of the combination cloth shirt is due in great measure to the difficulty of obtaining the required amounts of fancy goods and in part to the radical advance in price of such material as compared with white goods. To keep the price of the finished shirt within reasonable limits the manufacturers have adopted the device of making even the high-priced numbers with a minimum of fancy goods. Suits with French cuffs are gaining in popularity, and the use of the soft collar for summer wear is becoming general. For business wear the stiff-bosom shirt is losing ground to a noticeable extent, though most men cling to the established custom of wearing shirts with starched bosom and cuffs at all times. Many men are now wearing soft shirts with starched cuffs attached and a few wear those with French cuffs, particularly during the summer season. The prices vary as much as the styles or possibly more; it is possible to buy a shirt for 3 pesos or to pay four times this amount for a ready-made article or much more for one made to measure. The popular price seems to be 7 to 8 pesos ($2.10 to $2.40). A well-made shirt with pleated bosom, made of a gingham costing 17.5 cents per meter, can be bought for 9.50 pesos ($2.85), and the cost of production is given by the maker as 10.50 pesos ($3.15) per dozen. This is made of one material, with French cuffs, starched, a 12-inch pleated bosom with two buttons, and small buttons to close the sleeve opening back of the cuffs. The buttons are all fresh-water pearl seconds. A white shirt with starched, pleated bosom, to be worn with detachable cuffs, is made of material costing 56 centavos (about $0.168) per meter and sells for $2.50, the cost of manufacture being 9.60 pesos (about $2.88) per dozen. Soft collars are furnished with many of the shirts and attached roll collars are becoming quite generally worn, particularly for outing purposes.

Flannel shirts are popular for outing wear and are used to a considerable extent throughout the year, those for all-the-year-round wear having French cuffs and a neckband for attaching either the regulation style of collar or a collar of the same material as the shirt. For summer wear the attached collar is preferred, and a bosom is used of the same material, giving the shirt double thickness in front; a pocket with a buttoned flap is placed within 1¼ inches of the center, and usually there is a cord with tassels for the neck. Outing shirts are made with the little front tab at the bottom of the bosom with a buttonhole for attaching to the trousers or drawers.

Dress shirts are invariably white and are generally made with a bosom of plain white linen, though fancy-weave effects are also worn, usually piqué. The same style of shirt is used with the tuxedo, the mushroom pleat or silk bosom not finding favor among the best-dressed men. American-made shirts are not used extensively; there is only one American manufacturer whose goods are generally known. The shirts of this firm are sold in several grades. Once worn they are as well liked as those imported from Europe; in fact, many customers demand them, as they consider the fit far superior and there is no question that the workmanship is better. There is no comparison between the locally made shirt and those turned out by any well-known American maker. Probably a selling campaign would not be profitable, however, as the entire imports of cotton shirts for the latest normal year were only $56,000, and the imports of cotton collars and cuffs $23,000. The imports of linen shirts are about $10,000, and of linen collars and cuffs about $30,000. Even the entire trade therefore would not be especially large.

One of the manufacturers of collars and cuffs ventured the statement that American goods would not stand up as well as the European or native goods under the severe treatment accorded them in the laundries; but after some experiments conducted with a view to ascertaining the truth of this statement the writer is inclined to think that the reverse is the case. The locally made collar does not fit so well when new, and most certainly not after laundering, nor does the experience of two months, wearing alternately American and native collars, giving them the same amount of wear and sending them to the same laundry, permit the belief that the locally made article is nearly equal in value to the American.

Competition with locally made shirts and collars is difficult on a price basis, as the tariff is high.

Shirts made to measure are preferred by the few who are able to afford such a luxury, but their numbers are too small to have much effect on the trade. For the manufacture of the small number of custom-made shirts in demand there is purchased a limited yardage of the finer materials, mostly from France and England, in high-grade percales and zephyrs, madras, and a few fine French flannels. The last-named go into tennis and other types of outing shirts. The prices demanded for made-to-measure shirts ($5 to $10) are so high as to militate against any great increase in the trade; shirts of the same qualities could be had from the best American makers for much less money.

It would be difficult, if not impossible, to give an accurate idea of a color line suitable for the Chilean market, as the colors in request vary from season to season. For the present there is a tendency toward solid colors in the better class of shirts (light tans, creams, blues, lilac, and gray), the leading stores showing a good assortment of these shades in various priced lines. White grounds with fine stripes are also well liked, and a few shirts are shown with wide stripes; but the candy stripes popular in the United States a few years ago were never accepted in this market. The colors most salable are stripes of blue, lilac, black, or brown on a white ground. Fancy-woven goods in solid colors are shown by all makers, and retailers report that such goods move very freely in both white and fancy shades, the light tans, light blues, and lilacs selling particularly well. These goods are often made with corded stripes at intervals of a half or three-quarters of an inch, and between the stripes small figures (diamonds, squares, solid circles, or open circles), most of them small enough to be made on dobby looms. All the better-grade shirts are made of fast-color cloths and even in the cheaper lines the colors are generally fast if the cloths are fairly well treated in laundering. Little complaint is heard relative to lack of fastness of the colors in either fancy-woven goods or the better grades of percales and other shirting prints, but in some of the low-priced goods the dyes are not guaranteed. Some criticism is heard as to the finish of American white shirtings as compared with those from England; but when colored goods are mentioned it is universally admitted that American colors, whether in prints or woven fancies, compare favorably with those from any other country and they are acknowledged superior to the majority.

There is little demand for ready-made shirts suitable for workmen, as most of the workmen's shirts are made at home by the women of the household, of rather heavy materials, so that even when subjected to severe wear they last a considerable time. The wearing quality of the shirt is due in some measure to the fact that it is not subjected to severe treatment in the laundry at frequent intervals. There seems to be no prevailing style for these shirts; some of them are made to wear with a collar that has not as yet been purchased and others have roll collars attached. Most of them are indescribably dirty and ragged. There is little reason to believe that foreign shirts could successfully compete with the locally made article, as these are turned out at very low prices by the few factories that cater to the limited demand. The factory-made shirt is usually a solid color, invariably dark, and for the winter season flannel with attached collar and a cord for closing the front. A few shirts are shown in the cheaper stores made of a coarse fancy cotton in small checks or fine stripes, but most of them are made of a low-grade sheeting or drill, appearance being sacrificed to wearing qualities. These are entirely lacking in fit, and the workmanship is of the poorest type. The laborers as a class are seemingly content to dress in nondescript garments, many of them the cast-off suits of the more well-to-do people. The low earning power of the "roto" makes him negligible in any consideration of the market for imported goods of any sort aside from the cheapest and most serviceable cottons, and these in small yardages. The purchase of sufficient goods for a suit is an event in his life, one that occurs too seldom to be passed over lightly. Fortunately the climate is such in the central section, which contains the greater part of the population, that clothing is a minor consideration during most of the year.

LAUNDRY FACILITIES.

The cost of laundering a shirt varies from 40 to 60 centavos, and as the exchange is subject to wide fluctuations it is hard to state a figure that is representative. In June, 1917, the cost was 8 to 12 cents, while in September the cost was 12 to 18 cents, owing to the increase in value of the peso. In Santiago, Valparaiso, and a few other cities there are laundries fitted with modern appliances that are capable of doing good work, but even the best are not careful and garments last for a much shorter period than if laundered by the average American steam laundry. Aside from these larger establishments the work is done very poorly and the clothes are worn out with astonishing rapidity. In many of the smaller towns the only laundry facilities afforded are hand washing by the poorer class of natives, and the methods employed are extremely crude. The clothes are taken to the side of a stream and pounded on the rocks to remove the dirt and it is needless to say that in the process the material is subjected to such severe treatment that very few trips to such a laundry are required to render them unfit for further wear.

COLLARS AND CUFFS.

The metric system is universally used for marking sizes in shirts, collars, and cuffs, except those bought in the United States. The sizes most in demand run from 36 to 42 centimeters, or, if expressed in the sizes common in the United States, from 14¼ to 16½. Most of the collars used are made of cotton goods, an all-linen collar costing more than the majority of the people can afford to pay. A popular collar is imported from France at 4.50 francs per dozen and sold in the local market at 18 pesos per dozen or 1.60 pesos each (about 48 cents). Only one American collar is at all well known and this sells at the same price as the French collar mentioned. To those who have been accustomed to buy collars at two for a quarter, the price here seems extremely high, but in this instance the retailer does not get the entire difference. Collars, both cotton and linen, pay a duty of 3 pesos gold ($1.10) per dozen, or more than the invoice price, so that with freights and insurance, landing charges, and other expenses, the net cost to the retailer is much more than it is in the United States. The prevailing styles are about the same as in the United States, the poke, wing, and high-band turndown all selling in fairly large quantities. The lower classes seldom wear collars except perhaps on feast days or occasional Sundays; most of the laborers never own such a thing.

Fancy collars are popular with a certain set of the younger men, and shirts either made entirely of fancy goods or with bosom and cuffs of fancy material are frequently sold with two collars of the same material as the bosom. These may be either soft or starched. There is little or no demand for collars made of fancy-woven white goods, the preference being for either a plain white or one made of colored goods. For children there is a slight demand for rubberized or celluloid collars, but this has not as yet extended to the men's goods. It would seem entirely feasible to introduce the cleanable collar for those who are not able to afford the cotton or linen collar and the subsequent laundering.

Separate cuffs are used more extensively than in the United States. Many of the dress shirts even in the high-priced lines are made without cuffs, and the medium-priced shirts seldom have cuffs attached. White cuffs are worn with white shirts invariably and may be worn with colored shirts, but the general practice is to have the cuffs match the material of which the bosom of the shirt is made, if this is colored goods, and they are usually made of cotton even for dress wear.

NECKWEAR.

It would be difficult to say just what is the prevailing style in neckwear, as all sorts of cravats are worn, with the possible exception of the Ascot. The styles on display in the windows of the larger stores are similar to those shown in similar establishments in the United States. The prevailing mode changes from time to time, one season seeing the four-in-hand almost to the exclusion of other styles and another season having the bow predominant. Probably 80 per cent of the neckwear, aside from knitted ties, is the product of the local factories, made up from imported silks. Nearly all the shirt factories have departments for the manufacture of neckwear and several of the larger department stores make most of the goods that they handle.

Most of the tie silks come from France and Italy and are endless in variety of color and pattern. With this report are forwarded seven ties that are representative of the most salable styles and grades. Of these, two are strings and the others four-in-hands, all of local manufacture. Those who are familiar with the production of such merchandise will be able to gain from the data given a good idea of the requirements of the market and the margin of profit. Both the string ties are made of silk costing in Milan 7.50 francs ($1.45) per meter, the narrow-end tie selling for 2.50 pesos ($0.75) and the broad-end for 2.90 pesos ($0.87). The five four-in-hand ties represent a wide range of prices, both in materials and in product, the ties selling from 75 centavos ($0.23) to 6.50 pesos ($1.95) each, and the goods from which they are made costing from 1.10 francs ($0.21) to 6.75 francs ($1.30) per meter.

In the lower-priced ties economy is achieved by making the ends a trifle scant so as to get more ties out of a given yardage of goods; but this practice is not confined to Chilean manufacturers, imported ties evidencing the same thrift in regard to material. During the early part of the season prices are somewhat higher than in midseason and a cravat that could be bought in any first-class American furnishing stores for $1 to $1.50 costs $2.50 to $3. Imports in 1913 amounted to $50,000, the principal sources of supply being the United Kingdom, France, and Germany, in the order named, the United States supplying $5 worth. American manufacturers have so small a share of the trade because of the predominance of Europeans in the wholesale and retail trade and the fact that no special effort has been made on their part to obtain the business. The price factor enters to a certain extent, but there is so little difference in the quotations on American and European made neckwear that this item alone would not explain the dearth of American merchandise in this market. The silks used and the style of the finished goods are about the same as in the United States, so that there would be no necessity of getting up special lines for the export trade if a manufacturer should desire to market a part of his product in this country.

No window display is complete without a number of knitted ties, most of them in the coarse stitch shell effects and in combinations of colors similar to those popular in the United States. All these are made of artificial silk, most of them by English knitters, and are sold at very high prices, the common rate for them in the camiserías being 10 pesos each, and from that down to possibly $2.75 for a tie that costs $10 to $12 per dozen. The duties are undoubtedly high, 30 pesos gold per kilo ($10.95 for 2.2 pounds), but not sufficiently high to justify retail prices three or four times the cost. The accordeon knit tie is not in demand at present, nor are those made of thread silk salable, the price being prohibitive.

The tubular woven tie has never been introduced into this market, many of the dealers stating that they have never seen samples of such goods.

Mufflers are worn by all classes through the cooler months, even at times when one who is accustomed to the bracing climate of New

England would not think of wearing anything more than a light-weight topcoat or, in fact, would be quite comfortable if dressed in a winter-weight suit without overcoat of any sort. Most of the mufflers are wool in brushed finish, imported from England, the higher-priced types made of a mixture of fine wool and camel's hair or a small amount of vicuña, which gives them a particularly soft handle. The prices vary greatly according to quality, the coarser woolen mufflers selling at 8 to 10 pesos ($2.40 to $3) and the better grades as high as $5 or $6. Knitted silk mufflers are used but little, the popular style for use with evening dress being a silk fabric, cut and sewed, with a standing collar about a half or three-quarters of an inch high to protect the white collar. These sell at $5 to $7.50 each.

UNDERWEAR.

Several establishments in the central district are engaged in the manufacture of underwear and hosiery, so that a considerable part of the market requirements of these articles is supplied locally. Normal imports, however, are over $800,000 worth of cotton knit underwear (including hosiery) and nearly $130,000 worth of woolen knit underwear. Imports of cotton fabric underwear amount to about $31,000 annually, of woolen fabric underwear to $2,000, and of silk stockings to $13,000. None of the local mills attempts the production of the finer grades of goods; they confine their efforts to the manufacture of the low-priced heavier types that do not require the skilled operatives needed to make the more expensive lines. None of these mills has an equipment of yarn-making machinery; they purchase cotton and woolen yarns from England, Italy, Germany, Belgium, and other European countries, as well as from the United States, though the United States furnished a very small part of the total prior to the interruption of commerce with Europe. Nearly all the Chilean mills are controlled by foreigners, who purchase their yarn requirements from their own countries, from mills with whose products they are more or less familiar and which grant more liberal terms than are customary in the yarn trade of the United States.

The union suit is worn only by the members of the foreign colonies and by a very small number of Chileans who have become accustomed to its use through residence in the United States. Few of the stores carry them in stock and these only in small quantities. The majority of the men wear two-piece suits, but a large number wear no shirts in summer.

Fancy underwear is popular with the lower classes, horizontal stripes predominating in reds, blues, pinks, or browns on a white or cream ground, or alternate stripes of bright contrasting shades. These are largely of Spanish and Italian make, the English goods coming in solid colors or natural. The prices of ordinary two-piece suits are 3½ to 7½ pesos ($1.05 to $2.25) per suit for cotton goods and for woolen goods $5 to $10 per suit. During the summer season the sales are confined to medium weights and gauze, while for the colder weather there is a good demand for goods similar to American heavy-weight balbriggans and for a large quantity of fleece-lined goods. The houses are not provided with heating apparatus, so that warmer clothing is required than is the case in the United States, and it is the custom to wear overcoats or wraps of some sort in the house during the winter. Even the best hotels are without heat and the guests are forced to resort to all sorts of means to make themselves comfortable or go to bed in order to keep warm.

Among the samples of underwear for men will be found two of the most popular types of suits, both made in France, one marked French balbriggan, costing for the drawers $4.35 per dozen and for the shirts $3.75 per dozen. The selling price of these is 13 pesos ($3.90) per suit, leaving a comfortable margin of profit even with a high tariff rate. One of the leading stores admitted that the net profit on some of the lines of underwear is 125 per cent. Few, if any, of the merchants buy their goods direct from the manufacturer. They do all their purchasing through commission houses, though some of them order in quantities that would prove very attractive to the mills.

SUSPENDERS, GARTERS, AND BELTS.

The principal source of supply for suspenders was formerly Germany, with nearly 50 per cent of the trade; the United Kingdom and the United States came next in the order named, with 18 and 16 per cent, respectively. The type most generally used is made with elastic webs, metal cast-offs, and webbing button pieces. Those from France are usually of the Guyot type, and some of those from England are made with leather button pieces. Two or three American makes have gained a considerable reputation and are sold by practically every first-class furnishing or department store. One is sold in Santiago at 4.50 pesos ($1.35) per pair. The demand for suspenders is not so large in proportion to the population as in the United States, owing to the custom among the laborers and much of the Indian element of wearing what is termed a faja, a rather broad piece of cotton or other textile around the waist in lieu of a belt to support the trousers. Probably at least one-third of the adult male population never wear suspenders, and of the remaining two-thirds there is a large percentage that wear them infrequently.

There appears to be no particular type that can be said to predominate in the field in color, trimmings, or general makeup. The window displays show various types in several grades and the merchants state that the sales do not indicate that any special brace or type has better selling value than several others. There is a German suspender on the market with elastic webbing throughout, brass trimmings, cast-off feature, and webbing button piece with leather reinforcement at the buttonhole, which sells for 6 pesos; but the price is rather higher than the majority are willing to pay when a good article can be bought for a couple of pesos less. The lower-priced goods are those in which the fancy webs are sold to the greatest extent, and as a general proposition it may be said that the higher the color the lower the price. Suspenders may be bought at 2 pesos a pair, but they are practically worthless, the lowest price at which a satisfactory article can be purchased being about 3 pesos ($0.90).

Several makes of garters are sold in this market which are known throughout the United States. Three American makes sell at 2.25 pesos for the cotton, 3.75 pesos for the half-silk, and 5.25 pesos for the silk (about $0.68, $1.13, and $1.58, respectively). There is a

Spanish garter made up like one of the American makes and sold at 25 centavos less, but it does not give equal service and the sales are not large.

There is little demand for belts during the winter, nor are they as generally worn in the hot weather as in the United States. Relatively few of the men are accustomed to wear two-piece suits, but the example of the members of the foreign colonies and the greater comfort experienced by the few bold spirits who have ventured to adopt the custom are gradually popularizing this method of dress for the summer, and belts are becoming more salable every season. The preference for a rather wide belt is very marked; most of those seen in the best shops are at least 2 inches wide and very few are under an inch and a half. The color in best demand is black, followed by tan, fawn, and gray in the order named. The imports are mostly from Germany and France, these two countries furnishing about three-quarters of the entire supply; but American and English exporters are obtaining a larger share of the trade that was formerly held by Germany, and the belts are said to give better satisfaction than the German article. One of the peculiarities noticed in the market is the fact that many articles of American manufacture are purchased from London houses, the dealers stating that they can buy cheaper from the English exporter than from his American competitor. The prices range from 3, 6, and 9 pesos for the best-selling belts to 12 and 15 pesos for the highest grades. At the present rate of exchange these would cost from $0.90 to $4.50 each. Very few belts are seen made of goods to match the trousers, except those worn by recently returned visitors to the United States.

PUTTEES AND LEGGINGS.

Horseback riding is a favorite sport of the wealthier classes in Chile, who have their hunt clubs with regular meets, paper chases, etc. There is a considerable demand for riding clothes and accessories of the better class, including boots, puttees, and leggings. The mounted police, the members of several of the regiments of the Army, and many of the country people who have occasion to ride wear either leather leggings or puttees, but the latter find little favor outside of those who are compelled to wear them as a part of the required uniform. Leather leggings in tan are most favored, and those having a hook at the bottom and a small strap at the top sell better than the type that has a strap encircling the leg in the English fashion.

Puttees are not in demand by the civilians, as they are not so readily adjusted as the legging and it requires some little practice to put them on so that they appear well and remain in position. The greater part of the requirements in puttees is made in the country by the makers of uniforms as a portion of the regular equipment. Fabric leggings of khaki, such as are worn by American troops, are not used to any extent, nor is any other type of cloth leg covering generally worn.

NIGHTSHIRTS AND PAJAMAS.

A relatively small portion of the male population is accustomed to the use of nightshirts. The lower classes sleep in the underclothing worn during the day. The better classes generally prefer the pajama made of lightweight prints or woven fancies for the warm months and many wear flannel pajamas in the winter. Probably half of the market requirements is supplied by the local manufacturers and the remainder is imported from England, France, and Spain. Those made in the country sell at lower prices than the imported and are generally worth less, as the manufacture is far from the foreign standard; the garments lack any semblance of fit and in general are poorly constructed. The most popular fabric for pajamas is the woven fancy, similar to that made for shirtings, or the oxford for summer and plain flannels, viyellas, or woven fancy flannels for winter wear. The imported goods are supplied principally by English manufacturers, the prices ranging from 48 to 60 or 72 shillings per dozen for the finer lines. The tariff is nearly 100 per cent on these goods, which, with the expenses incident to shipping, insurance, etc., makes them rather costly laid down in the retailer's store. The ordinary sale price of pajamas costing in England 60 shillings per dozen is 20 pesos ($6) per suit for suits that were selling in the United States in the spring of 1916 for $1.25 to $1.50. These are made of a good grade of gingham now worth about 30 cents at retail. Most of the pajamas are made up with mercerized soutache-braid trimmings in front of the coat and fasten with pearl buttons; a few of the high-priced garments fasten with frogs of either mercerized cotton or silk. Few silk frogs are used, however, as garments with silk frogs have to pay a higher rate of duty, which makes them too expensive to sell in quantity. The sizes are given in the English system for the most part, as many of the goods are imported; but some imported suits and all those of local production are marked in metric sizes.

The foregoing remarks as to the use of pajamas apply to the urban population, particularly that of the central district, where the larger cities are located and where every store dealing in men's furnishings shows well-assorted lines of these garments. In the country districts the men still use the old-fashioned nightshirt, and there are, of course, a number in the cities also that wear this garment. Taking the country as a whole, it is probable that the majority of the men who are accustomed to wear special clothing at night favor the nightshirt. These are made of white goods, twilled shirtings, with a slight trim of colored goods around the neck and down the button piece usually. They may be made entirely of colored ginghams or for winter wear of printed flannels. The prices vary with the material and quality from 7.50 to 12 pesos (about $2.25 to $3.60) each. The plain whites are used much more than the colored goods. Competition with the locally made product is impossible because of the tariff duties on nearly all lines of nightshirts, and practically none are imported. The market is supplied by the concerns that operate shirt factories, the department stores that have manufacturing sections, or operators that cut the goods and have them sewed and finished by women who take the cut garments to their homes. Some of the higher-priced garments have embroidered collars and button pieces in white or colored; others are simply trimmed with an application of narrow strips of colored fabric.

WOMEN'S WEAR.

CLOAKS AND SUITS.

In cloaks and suits France leads by a wide margin, no other country furnishing anything like the quantity of goods that is imported from Paris. The styles follow the Paris fashions very closely and Chilean women are fully as insistent on the latest mode as those of any metropolis. Comparatively few coats are made in the country for the best class of trade, as the customers insist on having imported goods; even the copies made in the shops of the large stores may be excellent replicas of the originals. The manufacture by the local shops is not up to foreign standards, it is true, and it is equally true that the workmanship of the foreign manufacturer is not comparable with that of the better American shops, but there seems to be a prejudice against American suits. This is due in large measure to the mistaken idea that all the better American goods are imported, whereas in reality a very small part of American requirements comes from abroad. One of the first remarks heard in response to a question as to imports from the United States is that it is cheaper and easier to obtain goods at first hand, so that it would be folly to buy in the United States goods that are made in France. There seems to be no conception of the magnitude of the American domestic production in the minds of the Latin American merchants, most of whom apparently think that the American textile and clothing industries are in a rather undeveloped state and that they produce only the ordinary types of goods, purchasing the better qualities from European makers. Certainly the retailers, most of whom are Europeans, make no effort to disabuse them of this erroneous notion, and American exporters are at the mercy of buyers who are interested in furthering European trade rather than assisting the United States to build up foreign commerce.

The class of fabrics in vogue during the different seasons varies to such an extent that an attempt to note them would only tend to create a wrong impression; in one season plain goods have the lead and in another the rougher cloths or fabrics. The fashions of Paris and other centers are followed very closely. For the last winter season dark colors were the leaders—blacks, dark blues, browns, mahogany, and dark greens in smooth cloths, the coats selling at 150 to 250 pesos ($45 to $75), according to the materials, styles, and trimmings. Cheviots were also popular in effects similar to those shown by American stores, as well as coats made of the special cloakings in coarse twills and plaids such as are turned out in quantity by American mills at prices ranging from $1.38 to $2 per yard. The cost of the coats varies materially with the reputation of the manufacturer; even when they are made of the same fabric, one is supposed to have better style than another. A well-made cheviot coat that cost the importer $16.50 to $18 could be purchased for $45. This was made up with half lining, sateen sleeve linings, and large composition buttons. A coat of "paño liso" (a generic term for the smooth cloths similar to the broadcoths and meltons) costing $22.50 sold for $60.

For the spring season (September, 1917), many of the coats shown are made of gabardines, lightweight meltons, or "tricotina," a fine-twilled worsted with a slight nap. The names of fabrics really mean but little; instead of applying to a particular cloth as in the English nomenclature, the name includes a great range of goods, some of which do not even remotely resemble the cloth known under the translated designation. A cheap coat for spring can be bought for 59 pesos (about $18), but it is not only cheap in price but more so in appearance. A satisfactory coat costs at least 125 pesos ($37.50), and if one is at all fastidious it is necessary to pay over 200 pesos ($60). For the present season the leading stores are showing coats in black and colored gabardines at 240 and 280 pesos, which at the current exchange in September means about $72 to $84 for a garment that could be bought for a third less in any large New York store. In fact, if one may form an opinion from the latest papers available, those of early October, suits equal to those sold in Santiago for the last fall season (May and June, 1917), can be bought in New York or Philadelphia at less than half the prices quoted here.

Silk coats are much in favor in the present spring season; most of them have a side-pocket effect and cost at retail 160 to 250 pesos ($48 to $75). Others, more simple in design, are fully as expensive. These coats cost in France about $13.50 for the garment that is sold here at $50, and $22.50 for the $80 coat. Silks carry a heavy import duty, it is true, but the retail profits are enormous. The claim is made by the heads of the cloak and suit departments of the leading stores that American goods are not adapted for the market; but in view of the confession of the greater part of those interviewed that they have never visited American markets nor had an opportunity to examine any considerable lines of American goods, the writer is somewhat at a loss to determine how this conclusion was reached. Possibly there is some slight detail, not apparent to the layman, in the style of the coats and suits worn in Chile that differentiates them from those seen in American cities, but apparently, aside from the facial type, which is distinctly Latin, a group of well-dressed women from Santiago might be transplanted to Fifth Avenue without causing any comment as to the clothes worn. Fur trimmings were used extensively on the winter cloaks and suits, but for summer wear belts and buttons are the prominent features.

To attempt to give a full description of the suits worn by the women of Chile would require several volumes, since there is as wide a variation in styles and fabrics as in any of the countries of Europe or America. The popular-priced lines in ready-made suits range from 100 to 200 pesos ($30 to $60); for the better suits it is possible to pay as high as 1,000 pesos, or even more for an especially desirable model. The highest price represents the cost of an imported suit, probably from France, as that country furnishes most of the finer goods, whether in cotton, wool, or silk. The imports in normal years amount to about $172,000 for cotton, $324,000 for woolen, and $222,000 for silk goods. The cost of a suit is dependent not so much on the material from which it is made as on the ability displayed in the designing. The Chilean women demand the latest fashions, keeping in touch with the modes of Paris and other centers as closely as their American sisters. French fashion magazines are on sale in all the leading stores and several are translated into Spanish for the benefit of those who are familiar only with their mother tongue. In addition, the larger cities have branches of one or two of the leading

French houses, which carry model gowns as well as a complete display of samples of goods, colored reproductions of the latest fashions, and numerous plates in black and white showing the newest things in suits, gowns, and wraps.

For tailored suits serges and gabardines are the most popular cloths, followed by fancy worsteds. Most of the worsteds come in solid mixtures or rather neat effects with a black or very dark background, and the effect is brought out with rich heavy shades of blue, green, or brown. The lighter shades are used more extensively in the larger cities and towns, though nearly every woman wears black occasionally, but in the smaller places black is the predominant color. The poorer classes particularly wear black almost constantly, and the costume is completed with a black manto worn closely over the head and folded around the shoulders and fastened with a black-headed pin at the back. At first glance one might think that the greater part of the population of many of the villages were in mourning until it is realized that the sombre dress is simply a matter of custom, and that under the manto there may be, and probably is, a white or fancy waist.

DRESSES.

The import statistics indicate that many gowns are imported, but the extent of the trade in ready-made garments is greater than would be supposed from a glance at the customs returns. The manufacture of women's wear has developed to a much greater extent than the men's wear industry, the local establishments turning out some very creditable gowns. One or two of the larger establishments have their own designers, but the greater part of the work performed by these experts is making slight changes in the gowns copied from the imported models, so that there shall not be too great similarity between the gowns, as it would never do for two ladies to appear at a "función de moda" with gowns alike.

Sample gowns are brought from France and England, with a very small number from Germany, and the local designer follows the general lines, making minor alterations in some gowns and in others copying the original exactly. The majority of the customers prefer the imported garments and are willing to pay more for them than for an exact duplicate made in the country. As to the proportion of ready-made suits sold, it would be difficult to make anything like an accurate estimate, but those conversant with the trade state that probably 40 per cent of the dresses and 60 per cent of the suits are ready-made. The range of materials is calculated to suit all buyers, those having means patronizing the higher-class stores and finding the gowns made of fine fabrics, and those less well-to-do being able to purchase the same styles developed in less expensive materials. The United States, where the ready-to-wear trade has assumed proportions much greater than in any other country, supplies practically none of the garments for this trade in Chile, and according to the statement of one who has been connected with the trade for many years there is little hope that the United States will be able to make much headway against the French and English dressmakers. One reason for this is that the modes are changed somewhat by American designers and the modified styles are not so well liked by the Chilean women as those imported directly from Europe.

There are several well-established manufactories in the country engaged in the production of ready-to-wear garments for the women's trade, aside from the houses that manufacture for their own stores. These sell their wares throughout the country, some having a considerable force of traveling salesmen who visit the retail trade at regular intervals. According to the returns made to the Government, there are something like 200 dressmaking establishments, with total investments amounting to nearly $750,000, turning out a product worth slightly over $1,000,000 annually and employing about 1,000 operatives. These figures appear small in comparison with some of the enormous plants in the United States; but when the comparative size of the countries is taken into consideration and also the vast difference in the purchasing power of the people, the sum is not insignificant. In addition to these establishments, there is a large number of smaller ones whose aggregate output is probably larger, as well as the number of employees. There are forwarded with this report catalogues issued by two of the most important houses in this field, from which can be gained a better idea of the character of the goods in demand than from any amount of description.

An important factor in the trade is the catalogue and sample house, a branch of the business mentioned above. These are branch offices of French and English concerns where the resident agent has a few sample gowns, illustrated catalogues, samples of the goods from which the gowns are made, and innumerable plates of the latest creations of the house. It might seem that such a house would be able to do comparatively little in competition with a concern that carries stock from which a gown can be selected, tried on, and altered within a few days, while one selected from the catalogue can not be delivered within less than a couple of months; but in spite of the long wait involved, these houses do an extensive business and make serious inroads on the trade of the local merchants. The principal houses of this kind are both branches of well-known Paris houses; they have offices in Santiago and in some of the other west-coast cities and do an excellent business. Several of the American catalogue houses have sent catalogues to the various Latin countries, but none of them has gone after the business in the same aggressive manner as the two houses referred to. Some criticism is made of American catalogues in that they do not give details as to the width of skirts and some other points of importance; and as a result some of those who have ordered goods have been disappointed on the receipt of the garments to find that they were not exactly what was expected from the illustrations.

The popular fabrics vary from season to season, following the Parisian modes closely, so that any data as to the popular cloths would be extremely misleading if taken to mean that the same cloth or type could be marketed for any length of time. The serge and the gabardine are more or less perennially in favor, but the sales even of these standard cloths vary from year to year considerably, though there is always more or less demand. During the last winter, for example, velours have been in excellent demand, but it is problematical as to whether or not they will sell largely another season, with the chances rather against it. Certainly the patterns will not be at all similar to those prevalent during the last season. The question of colors is another that would require much study before an attempt is made to introduce a line into this market. The fashions in colors as in styles are regulated largely by the prevailing modes in France. For the summer season naturally the lighter shades—white, pearl, gray, pink, and pale blue—are in demand, while for the winter the general tendency is toward darker shades and heavier fabrics. Crêpe de chine is a popular fabric because of its excellent draping qualities, but it would be difficult to say that it is the leading fabric or, in fact, to state that any one cloth holds a predominant position in the market. Voiles are in good demand in all seasons, the cotton for summer and the wools and silks for winter wear.

The production of low-priced ready-made clothing for women is a well-developed industry, several fairly large establishments devoting their entire equipment to this branch of the business and marketing their products through the country. The prices of the dresses are 40 to 70 pesos, according to the material from which they are made and the trimmings. A satisfactory dress can be bought for 50 pesos ($15); but, naturally, these lack the style and appearance of the more expensive lines and are made of inferior materials. Most of the poorer women either make their own dresses or patronize the village dressmaker, who, perhaps, simply comes to the house to cut and fit, the customer doing the greater part, if not all, of the sewing. The dresses of this kind are made of the cheaper woolens for winter wear and for summer of cottons, ginghams, cotton crêpes, cotton cashmeres, or something of that character. Prints are used extensively by all classes for summer wear, the poorer people using the ordinary types and the well-to-do buying dresses made of the finer printed muslins, voiles, and mercerized goods.

KNIT UNDERWEAR.

No data are available as to the proportion of underwear imported for women's wear, the statistics grouping all the knit underwear for men, women, and children in a single item. The imports for 1913 amounted to about $826,000 worth of cotton goods, $127,000 worth of woolens, and about $2,000 worth of silk goods. The imports of silk garments are insignificant, consisting of a small number of jersey knit suits. The preference is for separate garments, union suits finding a very slow sale among the women as well as in the men's wear trade. One reason for the comparatively small amount of the imports is the domestic production, which is estimated to be sufficient to supply fully one-third of the market requirements. The local mills do not interfere with the importation of high-grade goods, but have made considerable inroads on the market for low-priced garments.

For cold weather the long-sleeved undervest is in great demand, or that with half sleeves, and for summer wear the half sleeves or sleeveless type. The greatest demand is for the cotton garment in light and medium weights, next for the cotton and wool mixtures, for the all-wool, and finally for silk. The colors preferred are white, pale blue, and rose, the whites outselling the colors in the ratio of five to three.

Fancy stitches are preferred to the plain knit, the larger part of the vests in the better-class stores being made on latch-needle machines with drop-stitch effects, one needle in four being apparently taken out. The preference for the spring-needle goods is due to the greater elasticity of the web, so that the garment sets snugly, conforming to the body more readily than the plain knit garments and permitting a smoother fit of the outer clothing. Unfortunately the cotton knit-goods section of the Chilean import statistics groups men's hosiery with underwear. There is no possibility of ascertaining what portion of the total should be credited to the hosiery trade, which is an important item and which would materially reduce the figures of knit-goods imports.

From investigation of the stocks in the leading stores and conversation with the department heads, it would appear that the United States supplies a very insignificant part of the underwear, most of the buyers stating that they have none in stock or a very limited assortment and advancing the claim that English, French, and German goods are lower-priced for similar grades. There may have been some truth in these statements formerly, but it would seem entirely feasible to introduce American goods at present, and there is every reason to think that when they were once brought to the notice of the trade a permanent market would be assured. The popular-priced vest sells for 3.50 to 4.50 pesos ($1.05 to $1.50), the finer grades selling as high as 8 or 10 pesos ($2.40 to $3) each. The more expensive are usually mercerized. The woolen vest retails at $2 to $5 a garment, the silk and wool at $4 to $10. Most of the knit drawers are sold in the winter and are ankle length, costing in the cheap and medium grades $1 to $2.25, and in the finer qualities $3.50 in cottons and from $9 to $15 in silk. There is a very limited demand for the high-priced goods. There is some demand for knit drawers in the knee length in cotton, wool, and silk, most of them made in knickerbocker style with an elastic band inserted in the lower hem to keep them adjusted to the leg. The same types of garments are worn by all classes of society, the difference being in quality rather than in style.

LINGERIE.

The figures for imports of underclothing, aside from knit goods, prove conclusively either that the manufacture of such goods has reached a considerable development in the country or that it is customary to make the greater part of these garments in the homes. The total imports are stated at some $35,000 annually, the United States furnishing less than 10 per cent of the requirements. In normal years Germany obtained about half of the trade, followed by the United Kingdom and France; but since war conditions have changed the course of commerce, the imports from France increased to three times the usual figures in 1914, but fell off again in 1915 to about half the quantity furnished in 1913; while imports from the United States increased from the negligible sum of $66 in the earlier year to $3,247 in 1915, nearly one-third of the total imports for the year, which should be the minimum share of American manufacturers. Whether or not this country will keep the trade gained lies entirely with us, as it should be possible for American shops to turn out these goods at as low prices as any of their competitors, especially in view of the superiority of American machinery and the greater efficiency of American operatives.

There is little prospect that the imports of lingerie will ever assume large proportions, as competition from the local manufacturers is increasingly severe on the simpler lines and low-priced goods for the cheaper trade; but there is every reason to think that the United States should be able at least to hold the share of the trade that is now coming to it. The local manufacturers have a practical monopoly on the cheap goods, owing to the high tariff imposed on imported garments, but they are not in a position to produce the better classes of goods, nor is it probable that they will cut into this trade for some time to come, if they are ever able to compete with the more expert workers of other countries. The scale of wages paid is pitifully low, but it must be taken into consideration that the output per employee is also very much less than in American workshops. The unit cost therefore is not very different and in many instances the advantage is with the American manufacturer.

The prevailing tendency in the trade is for white garments, very few of the better-class stores showing lingerie in colors aside from slips for the thin gowns worn to social functions or during the summer months. The popular-priced drawers are sold at $0.90 to $2, the higher-priced garments having a small amount of trimming; those trimmed with lace sell for $2 to $3.50, and the finer lines from $3.50 to $5 or $6, according to the material and trimming. The cheaper drawers are made very plain, possibly with a ruffle with machine-scalloped edge as the only trimming; the medium-priced garments have a little machine embroidery on the ruffle and the ruffle hemstitched to the leg; and the better grades are elaborately trimmed with lace or hand-embroidered, with ribbon insertion at the top of the lace. Chemises are carried in a wide range of prices, the simple, plainly made garment with practically no trimming selling at $1.25 to $2.50 and the fine, hand-embroidered garment at $2.50 to $10 each. Even at $10 there is not a surplus of embroidery. Cotton is the material most used in the manufacture of these garments, but there is a slight demand for linen chemises, which sell at $7 to $15, depending on the amount of embroidery and the fineness of the material. The sale of silks is so small as to be practically negligible. Corset covers are readily salable in various grades, the simpler styles costing from $0.90 to $2 and those more elaborate up to $5, or even higher for a fine lace article. Many of the corset covers are the products of the local shops, but, as is the case with the greater part of the lingerie, the better qualities are imported, the local manufacturers not encroaching on the fine goods. These are made of batistes and lawns, the higher-priced articles being trimmed with lace or embroidery or having ribbon beading.

Combination and envelope chemises are slowly coming into use, but the demand is as yet limited, and it will probably not reach considerable proportions for some time to come. Pantalettes are not in favor. Brassieres and camisoles are shown by all the better-class stores, and sales are of considerable volume.

BUST SUPPORTERS AND CORSETS—GARTERS.

Bust supporters are sold in a wide variety of types and fabrics, the popular numbers ranging from 8 to 15 pesos ($2.40 to $4.50). A variety of fabrics is used in their manufacture; one of the most popular types is made of a fine batiste with trimmings of narrow lace and reinforced with whalebone or one of the modern substitutes. All are so made that the reinforcement can readily be removed for laundering. Some are elaborately embroidered and sell at relatively high prices, depending on the quality of the material and the amount of embroidery. The United States is gaining considerable headway in this trade, and reports are to the effect that the goods are well liked by the consumers and that there is every probability of holding the trade after the war is over because of the extremely favorable impression the goods have made on the purchasers. With this report are forwarded catalogues of some of the leading department stores, well gotten up and well illustrated, an examination of which will give interested manufacturers a better idea of the requirements of the trade than any amount of written description, as the manufacturer can tell at a glance the styles in demand. Aside from the regular goods, the large stores carry certain lines of trade-marked specialties in bust supporters and abdominal bands, but the trade in these is limited.

In 1913 the United States supplied about 15 per cent of the corsets imported, France furnishing about one-third and England and Germany supplying a slightly larger amount than did American manufacturers. The popular corsets sell at 10 to 20 pesos and the finer qualities range as high as 100 pesos for an article made of silk coutil. American goods are well liked and are supplanting to some extent those made in Europe. The American corset is admittedly superior in many respects but is criticized because of the greater weight and heavier boning. The French corset sold in this market is very light and is made up with less reinforcement, so that it is more pliable and is preferred by many because of these features. There is no question as to the superiority of fit and style of the American goods, and if American manufacturers were willing to sacrifice durability and capacity for service to weight a much larger share of the business could be obtained. The best-known American corset in the market costs $12 to $18 per dozen. The high tariff rate is a convenient excuse for the exorbitant prices charged at retail for the various grades. The retail prices are entirely out of proportion to the cost; for example, a corset costing $24 per dozen is sold at 37 pesos ($11.10), which certainly shows a very satisfactory profit. The demand for corsets is not so great in proportion to the population as in the United States. Most of the women do not wear them, except when dressed for the street, and they seldom go out until after the noonday breakfast.

The locally made corset supplies the requirements for the low-priced lines almost entirely and the imported goods supply the needs in medium and high priced articles. There are few corsets imported costing less than $15 per dozen; most of them range from $15 to $36 in the regular lines and from $36 to $72 for the best grades, but the demand for the more expensive types is very limited. Comparatively few white goods are sold, the tendency being toward drabs, slates, yellows, and tans. An attempt made a few years ago to introduce the front-laced corset met with little success, but an occasional inquiry is heard for these, and it is well within the range of possibility that they will become popular or, at least, that a fair proportion of the imports will be of this type later. The limited demand for the high-priced goods is supplied by France with corsets made of silks in brocades. All these are elaborately trimmed, as are the greater part of the lower-priced goods from that country. The criticism most frequently heard of American corsets, aside from the weight, is that they are too plain to suit the taste of the majority of the women, who seek something pretty rather than durability and intrinsic worth. The French goods are decorated with lace and ribbon, while American corsets are on rather plain lines.

Most of the imported garters are brought from France, and considerable numbers are purchased every year. Owing to the custom of wearing corsets only a part of the day it is necessary to wear separate garters, which are preferably of the suspender type. A garter used extensively consists of a belt for the waist, from which are suspended the hose supporters, similar to those used on the corset. These are made with the back portion of the fastener of rubber, including the post that passes through the metal loop in front to fasten the hose securely. All-metal fasteners are not salable. There is not much demand for the circular garter among the better class of people, as they have become accustomed to the use of the suspender type from finding them on nearly all of the corsets, and have found them more comfortable, but among the lower classes the round garter is still quite generally used. The preference is for colors rather than for white, the most desirable shades being blues, pinks, orange, and a few blacks.

APRONS—BELTS.

Aprons are not much worn except by servants, who for dress purposes use those made of rather heavy materials with a wealth of embroidery, rather coarse in character, made with heavy threads. There is an increasing tendency toward the use of the small fancy apron such as is commonly worn in the United States; one of the enterprising merchants imported a number after a trip to New York and placed them prominently on display. These proved to be a popular innovation and it is possible that this missionary effort will result in the adoption of the custom of wearing aprons more generally. The aprons worn by the servants have been imported from France almost entirely; they cost 6 to 15 francs and are all white. Gingham aprons are practically unknown, except for school children, and these are mostly made at home.

Work aprons are not sold in any volume, as the majority of the wearers make their own during their spare time, using for this purpose the coarser grades of ginghams. These are made to cover the entire figure, with long sleeves, usually fastened with buttons at the back, and in some cases having a string at the waist to make them a little more trim in appearance.

Leather is the favorite material for women's belts, most of which are made up with elaborate buckles and in colors, the belt frequently matching the costume or making a pleasing contrast with a complementary color. Plain belts are not in great favor; most belts shown by the leading stores are made of patent or other fancy leather with fancy buckles. Tans are worn commonly with the lighter shades of gabardines and at times with suits of contrasting colors. The fashions in belts change from one season to another as in everything else, so that chamois or suede may be the popular leather at one time and another season the prevailing mode will be patent leather in colors or black or possibly one of the fancy leathers. The prices vary with the quality and material from about $0.90 to $5 or $6. The entire trade amounts to about $8,000 a year, Germany supplying the largest share, followed by France and England, while the American share of this business amounted to $136 in 1913 and $422 in 1915. These figures include all leather belts for men, women, and children. Fabric belts are sold in smaller quantities; about all are made of cotton and are used for a variety of purposes, such as cartridge belts, those for boy scouts, etc. Germany furnished over half of these and England and France about equally divided the remainder of the business.

KIMONOS, DRESSING SACKS, AND BATHROBES.

There is an excellent demand for the various types of negligee garments, such as kimonos and dressing sacks. Nearly all the former are in the Japanese style, made of such materials as liberty silks, crêpe de chine, and other light fabrics. Few sell in the cottons, as they are worn only by the well-to-do people. Most of these negligees are very elaborate garments and sell at what appear to be high prices, ranging from 40 to 200 pesos each, the first figure representing the cost of the simplest kind of kimono, while the latter figure is the price of a well-made garment, well-trimmed, and of excellent material. There is a growing demand for the cotton goods, as those who can not afford silks are coming to appreciate the utility of the garment and have practically forced the merchants to stock lines more in keeping with their purchasing power. The cheaper garments are made of various materials, such as printed flannelettes, plain and fancy cotton crêpes, percales, and ginghams, with trimmings of lace. There is reason to believe that a well-selected line of such garments would readily find a market, and the same holds true of a similar line of dressing sacks. The price of the latter ranges from 35 to 150 pesos ($10.50 to $45) in the finer lines and for the cotton goods in similar styles from 10 to 30 pesos ($3 to $9) or even higher. The prices quoted are not those of the high-priced stores but those catering to the wants of the moderately well-to-do class, the salaried class, and the higher-paid wage earners.

Bathrobes are sold in fairly good numbers, most of them in the heavier types of cottons, napped on both sides, the same material that is employed in the United States. The better grades are made of woven fancies and the lower-priced garments of printed goods; a smaller number is made of terry cloths or the lighter cottons, such as crêpons or ginghams. The last-mentioned are more nearly in the kimono class, but are designated as "batas" in the trade, and are worn commonly as negligees rather than simply as bathrobes. The prices range from 12 to 50 pesos, or even higher, for the heavier goods, but the figures given include the lines sold in quantity. A robe made of percale, gingham, or batiste can be bought for about $4.50, while one made of cotton crêpe or voile, machine-embroidered, costs $8 to $10. All the prices vary from week to week when quoted in dollars, as the rate of exchange is subject to considerable fluctuations even within relatively short periods, and a garment that costs $5 to-day might well cost either $4.50 or $6 a few days hence, if it became necessary to buy pesos with dollars at the time of making the purchase.

A favorite fabric for making bathrobes is that made on the spring-needle knitting machine, napped on the outside, something on the order of eiderdown. These are used in solid colors to a limited extent, but the best sale is for the fancy effects; some are printed, but the finer qualities are knit from colored yarns. A number of mills in the United States produce the type of fabric required, and American manufacturers could probably obtain a fair share of the trade in these garments if an effort was made to do so. In fact, the results obtained by one American jobbing house compel the belief that a manufacturer's line would achieve a notable success in this market. The expense incident to introducing such a line by the manufacturer would not be justified unless the salesman carried other goods, as the sales would not warrant the trip. If a rather extensive line of lingerie, negligees, bathrobes, and kimonos were produced, there is no doubt that the sales would be eminently satisfactory. A type sample of the knit-fabric bathrobe is included in the samples accompanying this report. This is a French production, costing 22.50 francs ($4.34) and selling at 73 pesos ($21.90). It is not representative of the highest grade but a line that is sold in fairly large quantities.

VEILINGS.

All sorts of veilings are used extensively—nets and tulles in cotton and silk, figured and plain, with and without borders. Custom or decree of the church forbids the wearing of hats inside the church building, so that on Sundays the women are compelled to wear veils, mantos, or some similar head covering. Even during the week this type of headdress is as common as hats, during the summer particularly, though the wealthier class wear hats in the afternoon and evening throughout the year. No special style of veil seems to predominate; the stores show all kinds—those with all-over figures, dots, scattered-flower effects, fine net, tulle, illusion, and many others. The greatest demand is for black; every one wears black for church attendance, and most women also when wearing veils in lieu of hats. The manto of the poorer class possibly would hardly be termed veiling, as it is frequently made of cotton cashmere, but for feast days and church attendance many of these women wear a finer manto made of nun's veiling or similar goods. The mantilla, the headdress of the Spanish women, worn over the high comb, is used only at fancy-dress parties or on the stage.

No bride can be properly married without a veil, no matter how poor the family, and bridal veils are featured by every store. Many of these are cotton tulle, usually with elaborate borders and frequently figured, costing 42 to 65 pesos or more ($12.60 to $19.50). A silk-tulle veil 2 meters square can be bought at $7 to $15, while a Chantilly tulle for bridal veils, 3 meters wide, can be had for $3 to $5 a meter. Colored veils are not nearly so salable as blacks, though every merchant is obliged to carry an assortment in all the prevailing shades.

SEPARATE SKIRTS—PETTICOATS.

The increasing popularity of the shirt waist has led to a demand for separate skirts that has become a very important item in the apparel trade. This branch of the business is increasing every year, and the ready-to-wear skirt is encroaching considerably on the made-to-measure garment. For summer wear the cottons are naturally in favor, piqués particularly, with poplins and linens as the next best sellers. There is a good demand for woolen skirts also, the sales exceeding those for cottons, as many of the summer cottons are made up with waist and skirt of the same material. One of the most popular materials at present is gabardine, which possibly outsells serge for the moment; after these come a long line of fancy worsteds, usually in dark colors and invariably in small, neat effects—possibly open checks, four of ground and two of color, or solid checks up to a half inch in size. Plain cloths are much in favor, piece dyes and mixtures, the latter largely grays or the various types of dark tan and heather. Most of these are supplied by the French exporters or are produced by the tailoring departments of the large stores.

The styles follow more closely the French type than the American, and it would require considerable propaganda work and no little time to introduce a line of American goods, as the consumer is inclined to purchase rather more elaborate garments than are generally sold in American stores. The prices appear very high in comparison with those in the United States. A linen skirt costs about $16 for a plain type, a serge or gabardine costs $30 to $35, and a fancy worsted up to $60.

Most of the trade in petticoats is done in cotton goods, silks selling in limited quantities because of the high prices. The sample forwarded with this report cost $4.85 in France and sold in Santiago for $22.50, about double the cost of a similar garment in the United States. The favored colors appear to be the combinations of green and blue, green and red, red and blue, bronzes, slates, and pearls. There is a fair demand for the jersey-silk petticoat and for the crêpe de chine, and also for slips of these fabrics for wearing with the thin summer dresses. The cotton petticoats are made of percales, sateens, and muslins, many of them in stripes; the lower half of the garment has the stripes horizontal and is trimmed with a ruffle of the same material about 2 to 3 inches wide. The cheaper goods sell at $2 to $5, while a well-made mercerized garment will bring as high as $12. There is very little sale for the extremely low-priced garments, as the working class can not afford to buy ready-made goods but purchase the cloth and make the garments at home. During the colder months there is a sale for the knit petticoat, grays selling in larger quantities than any other color and probably outselling all other shades combined. Some of these are latch needle goods, but the majority are jersey-knit. France and England supply the major part at present, goods from these countries taking the place of those formerly brought in from Germany. The same objection to American goods is heard in this line as in several others, that the garments are not made up elaborately enough to suit the taste of the Chilean trade. There is no complaint as to the fit or material, nor as to the workmanship. There is practically no factory production of these petticoats in the country, the entire market requirements coming from abroad. A little attention paid to the special needs of the market in the way of trimmings would permit Americans to gain a considerable portion of the trade. The superiority of the workmanship in American goods is generally admitted, but intrinsic value is not the criterion in women's wear; the appearance counts for more with the buyer than does workmanship in the making or quality of the material. This is true of most lines, whether ready-made goods or materials.

NIGHTDRESSES AND PAJAMAS.

Batistes and lawns are the fabrics most used for the manufacture of nightdresses, and the prices for the lines sold in quantity range from 15 to 25 pesos ($4.50 to $7.50). There are garments selling at 10 pesos, or even less, but these are inferior in workmanship and quality of material and are not sold in large quantities. The poorer classes prefer to purchase the materials and make the garments at home rather than pay the relatively high price charged by the retailer for nightgowns that will not give nearly the same service. The low-priced garments are made up very simply with scarcely any trimming and of very ordinary shirtings or sheetings, selling as low as 7.50 pesos ($2.25), while the finer grades are made of excellent materials and are elaborately trimmed with laces and ribbons. A nightdress made of a fine nainsook, trimmed with ribbon and embroidery and with sleeve ruffle hemstitched to the sleeve, costs 31 pesos, the chemise to match costs 18.50 pesos, and the drawers 21 pesos (about $9.30, $5.55, and $6.30, respectively). A garment made up of a good nainsook with yoke of narrow lace and lace insertion in the sleeves costs about $7, the chemise to match about $4, the drawers and corset cover to complete the set the same as the chemise, making the complete set cost $19. Most of these are made of white goods, though there is some demand for light colors.

During the colder months there is a fairly good demand for nightgowns made of flannels, cotton, cotton and wool, and wool. These sell for 15 to 35 pesos ($4.50 to $10.50) for the cotton goods, up to 50 pesos for the mixture, and from 50 to 100 pesos for the all-wool gowns. The demand for the all-wool gowns is decidedly limited. The lower-priced woolens are popular among those whose means will permit the expense, the best-selling lines marketing at about 60 pesos.

The use of pajamas by the women has just begun, but every season sees an increase in the demand, with the probability that pajamas will form an important factor in the trade in the not distant future. The better-class stores are showing these garments made of fine cottons and of crêpe de chine and other light silks. The most popular type is made to tie around the ankle, with a short ruffle below the draw string. The price of these is 17.50 to 100 pesos ($5.25 to $30), depending on the materials and trimmings. Pajamas have not been sold in the lower-priced goods to any. extent, only the more well to do purchasing such a novelty. Most of them are in whites, with a few in pale shades of pink, blue, and yellow. A suit made of a fine white lawn costs about $8 to $9; made of a swivel silk (cotton warp and silk filling), about $16 to $18; and.of pure silk up to $25. Most of them are fastened with pearl buttons; others have frogs of mercerized or silk cord.

Attempts to convey an idea of relative values without comparison of the goods are almost hopeless. The best method of giving the manufacturer concrete data is by a means of samples and prices, so that comparison can be made with similar goods of domestic manufacture. With this end in view various samples have been purchased and forwarded to the Bureau, so that interested persons may have an opportunity to examine them and gain an accurate idea of the type of garments quoted at certain prices in this report. Typical of the difference in invoice price and the cost to the consumer is the nightgown from France costing 81 francs ($15.63) per dozen and retailing in Santiago at 20 pesos ($6) each. This is the regular ratio of difference in cost and selling price, but frequently the opportunity for profit is even greater than is indicated by this example. A corset cover costing 2.40 francs ($0.46) sells at 8 pesos ($2.40), a chemise costing 2.75 francs ($0.53) sells at 12 pesos ($3.60), and drawers costing 10.10 francs ($1.95) sell at 28 pesos ($8.40).

CHILDREN'S CLOTHING.

DRESSES AND SUITS, OVERCOATS—OUTING SUITS.

The materials used in the manufacture of children's suits depend to a great extent on the season for which they are intended and also on the section of the country in which they are to be marketed. In the northern section, a very small market, there is a demand for more cotton clothing than in the central and southern sections because of climatic conditions, and cotton suits are worn by many of the children throughout the year. In the central region it is not unusual to find the lighter-weight woolens worn through the summer. Cotton clothing in summer is the rule rather than the exception, however, in the greater part of the country. The dresses worn by the little girls are usually elaborate creations, extremely short even in cold weather, and invariably worn with short socks. The every-day garment of the child of school age is some sort of uniform, each of the schools requiring the pupils to wear a special type of dress. Some of these school dresses are serges, others are some cotton material. For wear out of school hours there are all sorts and styles of dresses in cotton and woolen goods, from the gingham at $4 or $5 to the embroidered lawn at $20, or in woolens from $12.50 to $30 or higher. A lower-priced gingham may be bought at $2.50, but it is very inferior, and there is relatively little sale for garments at this price, as the potential purchasers of the garments in this class prefer to buy the materials and make up the clothes at home.

Flannels of the viyella type, used extensively for dresses for summer wear, cost about $6.50 in the simpler models and up to $10 or $13.50 for those more elaborately trimmed. For winter wear flannelettes are the favorite materials for the poorer classes, and those having more means purchase woolen and worsted materials. Woolens are not so popular as the smoother, clear-finished serges, gabardines, poplins, and fancy worsteds, though there was a good sale for the velours during the 1917 season.

For very young boys the dresses are similar to those worn by their sisters, though sometimes made of heavier materials and less elaborately trimmed, and cost $2 to $10, according to quality and style. These are made of percales, ginghams, piqué, and the fabric termed "brin," a sort of light duck, made in white and fancy-woven effects. The coats are made of piqué, flannels, or woolens. For those just beyond this age there has been a vogue for knit suits made in dark colors—greens, maroon, grays, and blues. From the knitted suit the youngster graduates into the blouse and knee-pants style, with a coat for the colder weather. A popular style is a suit made of dark gabardine, a blouse of percale or tussah silk, with a broad collar of embroidery to be worn over the coat. This costs $20 to $25 a suit. A serge suit consisting of jacket and knee pants, with blouse of silk, may be bought for $18 to $22.50. The favorite colors for these suits are navy blue, gray, or beige. For the poorer class the suits are invariably of brin or fancy drill and cost $4 to $6 a suit. Galatea cloth is also much used for suits for children, in solid colors or in narrow stripes, and sells at the same prices as the drills.

Russian blouse suits are popular, made of gabardines, cotton poplins, serges, or drills, and costing in serge about $15, in poplin or drill about $7 for the same model, and in wool alpaca $7 to $10, according to age. The trousers cost $4 to $6.

Children's clothing is of considerable importance, the variety of fabrics and styles making it necessary to carry an extensive line in several prices. For the most part the goods used are in small checks or plain mixtures and solid colors; stripes find little favor. Gray mixtures are popular in lighter shades than those most in demand for adult wear. The proportions run from 20 per cent of white to as high as 50 per cent; sometimes the white is made up with a dark-blue base but more commonly with a blue black, which tends to produce a clearer mixture than could be obtained with a dead black and an unbleached white. All these suits are made with short breeches, hardly reaching the knee, and are invariably worn with short socks, even when the boy is well grown. Occasionally a sailor suit is seen; this, of course, is made with long trousers, rather close-fitting from waist to hips and full at the bottom of the legs. The blouse is cut low at the neck and has an embroidered dickey with some appropriate design—an anchor, star, or other figure. For boys from 2 to 6 years old the suits are varied in style; most of the blouses have double collars, one of the goods of which the blouse is made and over this a detachable collar of washable material, usually in sailor style. Norfolk jackets are also much worm by the little folks, this kind of suit coming in cassimeres, blue serges, cheviots, whipcords, and fancy worsteds. Many of the Norfolk jackets are made to button close to the neck with a standing collar, and naturally these are worn without the dickey, the suit consisting simply of the two pieces, jacket and trousers.

Every house carrying children's clothing that caters to high-class trade imports a limited number of suits of finer quality in special styles—a few of fancy cloths but most of them in blue serge or cassimere and some in black. The blacks are usually more simple in style, as they are worn for mourning suits. During the hot weather, from December to February inclusive, the youngsters wear washable suits made of drills or brin (fancy drills, checks, and stripes) or of some tropical-weight woolen goods. These are usually more simple in style than the winter clothes, and the colors must be fast to stand washing. The cheaper suits do not have the dickey separate from the blouse, as do the woolen clothes for winter, but attached at one side inside the blouse. Extra trousers are carried in stock, as these wear out much faster than the blouses, which are often left off during the warm weather. The cheaper line sells for $8 as the high limit in ages up to 5 years, $10 up to 9 years, and $12 up to 12 years of age. The best line sells for a little over double these prices for the woolen suits, while the prices for the summer clothing run about $3, $4, and $5 for the lowest-priced line and $10, $11, and $12 for the best line. For boys from 2 to 5 during the last winter there was an excellent sale for knitted suits made of tuck-stitch material, usually in blues, reds, and grays. Similar suits are worn to a considerable extent in lighter-weight goods for summer.

During the cooler months there is a good sale for children's overcoats made of solid-colored goods. The raglan style leads and the greater numbers are in dark-blue cheviot. Double-breasted coats are much in favor, gotten up with brass buttons bearing anchors and cut in military style. Another popular style is short, reaching about to the knees, also with brass buttons; this style is locally known as Caban. For the winter a heavier garment is used and more fancy goods, such as cheviots and homespuns, are worn. The military style is much liked, always with the capuchin hood, which is detachable, buttoning under the collar. Blacks must be carried, as they are absolutely required for mourning. The mourning period is not only longer than in the United States but much more strictly observed. Capes of military style are commonly worn by the young people; nearly all have the detachable hood made of a rather heavy navy-blue material with a decided nap and frequently lined with flannel. These are made in sizes from 46 to 112 centimeters and sell at 9 to 15.50 pesos ($2.70 to $4.65) each for the lowest-priced cape; usually two more expensive lines are carried. The measurement is from the center of the collar at the back to the bottom edge.

The boy-scout movement has gained great headway in several of the west-coast countries, nearly every town and city of any size having one or more brigades. There is an excellent sale for suitable clothing for their outings and other activities. The winter suit is made of a khaki-colored cheviot and the summer costume of cotton khaki. The blouse is made with a rolling collar that has two buttons and a buttonhole on the point; the buttonhole permits the passage of a third button placed in the proper position on the blouse, so that when worn it looks as if the three buttons were on the collar. The breeches are short, reaching hardly to the knees, and have quite full legs. With these are worn woolen stockings similar to golf hose. The price of the khaki suit is 19 to 21 pesos, paper.

SCHOOLBOYS' SUITS AND OVERCOATS.

To satisfy the clothing requirements of the schoolboys 12 to 16 years of age it is necessary to carry a complete line in plain and fancy goods and in styles somewhat similar to those worn by men. Three grades must be carried, the cheapest to sell for 48 to 54 pesos ($14.40 to $16.20), the medium-priced line from 55 to 70 pesos ($16.50 to $21), and the highest-priced line from 75 to 90 pesos (22.50 to $27), according to size and the quality of the material. The waist measures for these suits are 32 to 37 centimeters; length of leg, 66 to 80 centimeters; length of coat, 58 to 70 centimeters; sleeve, 64 to 78 centimeters; and vest, 54 to 62 centimeters.

For summer wear a popular fabric is brin, which is sold under various names in different countries, many places designating it as a fancy drill. In three-piece suits these are sold at 32 to 50 pesos, and in two-piece suits at 8 to 10 pesos less.

Separate trousers should be carried to sell at 15 to 18 pesos ($4.50 to $5.40), and also alpaca coats, mostly in blacks, to sell at 21 to 24 pesos ($6.30 to $7.20). Fancy vests are much affected by the youths, the most popular being a white or a striped piqué. These sell at 7.50 to 10.50 pesos ($2.25 to $3.15) each.

Lightweight coats are not in great demand, the styles following those of the winter season, in lighter colors and most of them in the raglan style. These are made of cheviots usually. Winter coats are an important item in the annual sales and it would seem that there should be an opportunity for American manufacturers to obtain at least a portion of this business, as well as a part of the trade in suits for both men and youths. Certainly if the prices seen in the show windows are displayed with the idea of drawing trade, a few of the far better tailored garments shown in any American clothing stores at much lower prices could not fail to win favorable comment here. Prices on all types of merchandise are much higher than they should be, and clothing in particular is very dear. The lower-priced overcoats are sold at prices ranging from $15 to $18, and for a really good garment it is necessary to pay $35 or more. Grays are the most salable in worsteds, cheviots, or regular overcoating cloths. It seems a little peculiar that there is no demand for meltons or kerseys, but those who are thoroughly conversant with business state that such cloths have never been in demand for overcoatings. Soft-finished double-faced goods are favored, the shell usually of a solid color or a mixture and the back plaided with a combination of shades that blend with the face. Most of the overcoats are made with collars of the same material; velvet collars are worn very little.

Double-breasted coats are not much in favor nor are those with a fly button piece; nearly all have the buttons through the shell. Silk-lined coats are worn by those who can afford the extra cost, but the assortment is limited. The English type, very full and half-lined, is more in demand, and the raglan also sells in large numbers. The sizes most wanted are as follows: Chest measure, 38 to 43 centimeters; sleeve length, 68 to 78 centimeters; coat length, 96 to 106 centimeters.

SCHOOL UNIFORMS.

The, students at the National Boarding School, which has accommodations for some 400 pupils, are obliged to provide themselves with four uniform suits, three of brin, or fancy drill, for wear in-doors and one of woolen material for street use. When the weather necessitates additional clothing, capes of woolen material are worn in lieu of overcoats. The suits are made in three pieces; the coat is cut in dolman style and the trousers are long. The pupils of the School of Arts and Sciences, also a Government institution, are uniformed in double-breasted navy-blue suits with brass buttons for street wear and in lead-colored two-piece suits for school wear, the latter made with dolman and trousers. The former suits sell for $25 and the latter type at $20 each. The navy-blue cape, 110 to 120 centimeters long, sells for $13. The working clothes are made of blue drilling and sell at $5 per suit. The private schools under the direction of the various religious orders for the education of the poorer youths and boys require the wearing of special garments, but these are invariably made in the homes. The attendants of the several agricultural schools maintained by the State purchase the required uniforms from the commercial houses.

NIGHT GARMENTS—BELTS.

For children there is some request for the combination night garment with feet usually made of cotton flannel, but these are not an important item. Made of a good class of shirting, the combination without feet costs 5.75 to 7.50 pesos, according to size, the lower price representing the cost of a garment 65 to 80 centimeters long; 6.90 pesos, the price of the 85 to 95 centimeter garment; and the higher price, the 100-centimeter garment. Nightgowns for girls sell for 3.90 to 6.50 pesos, according to sizes; the 2-year-old costs 3.90 pesos; the 6-year, 4.75; the 10-year, 5.50; and the 14-year, 6.50 pesos ($1.17, $1.43, $1.65, and $1.95, respectively). All these are of the same grade, made of a good grade of shirting, with very simple trimming on collar and button piece. Articles made of a slightly better material and trimmed with lace or embroidery cost 7 to 12 pesos (about $2.10 to $3.60).

For children's wear the most popular belt is made of patent leather, blacks and whites predominating but reds, blues, and browns selling in fair quantities. These are invariably wider than the belts worn by men, most of them at least 2 inches, and up to 3 inches in width. With the Norfolk or Russian blouse suits leather belts are the customary type, but with the former style there is a slight demand for belts made of the same material as the jackets. In general, the preference is for the ordinary type of buckle in nickel in both men's and children's belts. About 30 per cent of the children's belts are made up with brass buckles or those enameled in colors to match the shade of the belt itself. The children's belts are usually made with grommets of brass or enameled metal to match the buckles.

HANDKERCHIEFS.

One of the most important items among the smaller articles is handkerchiefs, the imports for 1913 amounting to $242,000 worth of cotton goods, $16,000 worth of linens, and over $61,000 worth of silks. The share of the United States in the total of $319,000 worth amounted to only $465 for that year, while in 1915 it furnished only

$121 worth. The principal sources of supply are the United Kingdom, Germany, and France. The United Kingdom sent nearly $212,000 worth of cottons for 1913, over half of the linens, and 21 per cent of the silks. Japan supplies a considerable share of the silk goods in the cheaper grades, especially those with elaborate embroideries. Handkerchiefs with colored borders are much more in demand than in the United States, some of them with woven cords and hemstitched in addition to the color, others with only the hem in colors; many of the latter type are in printed effects. Prices vary with the quality and size as well as with the construction. A fairly good quality from England is invoiced at $0.584 per dozen and is retailed at 5.50 pesos (about $1.65) per dozen. This quality is frequently featured as a leader in the show windows. It is 17 by 16 inches with a ⅝-inch hemstitched hem. Another popular number from England is a 15 by 14 handkerchief with the same width hem and a half-inch band of eight cords three-eighths of an inch inside the hem. This costs $0.728 per dozen and retails at about $2 per dozen. Both these styles are in white. Another English handkerchief that sells in quantity is made with a colored hem seven-eighths of an inch wide, and three-eighths of an inch inside the hem are three colored bands inclosed with cords, the colored portion 3/32-inch wide, the ground a trifle wider, and a quarter of an inch away another set of three colored stripes. The body of the handkerchief consists of stripes of color similar to the border, ⅜-inch wide, separated by 1¼ inches of white, each of these color stripes supported by a cord at each side. These cost $0.98 per dozen and retail at 11.50 pesos ($3.45) in the 17 by 16 inch size. A 19 by 18 inch article, made of a fine lawn, invoices at $1 per dozen and retails at about $2.90 per dozen.

Initial goods are not in good request; the sales are limited and the qualities are not of the best. Most of them are for women and children. A type sample of this class is 12½ inches square with ¼-inch hem and with a simple script initial and a spray of flowers in the corner. This comes from England, invoicing at $0.70 per dozen and retailing at $2.25 per dozen. A more popular type is 11½ inches square with scalloped edge and with sprays of flowers around the border. This is also English, invoicing at $1.93 per dozen and retailing at 1.70 pesos ($0.51) each. Pure linens are not sold in large volume nor are they of particular interest to American manufacturers because of the small possibility of successfully competing with the linen manufacturers abroad, who have access to the raw materials at prices that practically defy competition.

In silk goods Japan has the largest trade, supplying $18,000 worth in 1913; England came next with $13,000 worth, Germany had almost as much, and France but little less, and none of the other countries exceeded $1,500 worth. The greater part of the Japanese goods is a specialty of that country and there is no possibility of gaining a share of this trade; but it would seem entirely feasible for American manufacturers to compete with the European countries on the better-grade goods. England supplies many silks costing 9 to 24 shillings per dozen and a smaller quantity of more expensive lines, those coming from France and Germany costing about the same, with a limited number of the better goods from France costing up to $15. The import duties on silks are very high, making the cost of the goods laid down in the store about double the invoice value. The retail price is nearly prohibitive, so that only the well to do can afford the luxury of silk handkerchiefs of the better grades. One type costing 15 shillings ($3.65) per dozen retails at 4.50 to 5 pesos ($1.35 to $1.50) each.

Women's handkerchiefs in laces and embroideries are in good request, particularly the latter in medium-priced goods that can be bought for $2.50 to $3.50 per dozen and retailed at prices ranging from $0.75 to $1.25 each. The finer lace goods are sold in very limited quantities, most of the trade in laces being those with a border of machine-made lace, such as valenciennes, usually not very wide. These sell at 4 to 10 pesos, the popular numbers running about 6 to 7.50 pesos each ($1.80 to $2.25). Many of the women, who are expert needle women, spend much of their spare time in making embroidery or lace, with which they trim their own handkerchiefs.

The most popular type of printed handkerchief is an article formerly costing 1s. 4d., which sold at 3.96 pesos per dozen, or 35 centavos each (about 10 cents, or 7 cents when the peso was worth 20 cents, the average for about 10 years before the war). This grade of goods, a sample of which is included in the collection forwarded with this report, costs at present 1s. 10d. to 2s., and is retailed at 5.50 pesos per dozen, or 50 centavos (about 15 cents) each. This is a small size, 11½ by 11 inches. The old-fashioned bandanna handkerchief is little used in Chile, though a few are to be found in the cheaper class of tiendas. There is, however, a printed article that enjoys a very good sale; the entire surface is printed in blues, light browns, pinks, and slates. These are British goods, costing 4s. ($0.97) per dozen and retailing at 11.50 pesos per dozen or 1 peso each. Fluctuations in exchange constitute one of the serious drawbacks to carrying on a mercantile business in the country but one that usually is taken advantage of by the merchant, who invariably figures his costs in gold and sells on the basis of the depreciated paper currency.

GLOVES.

Various types of fabric gloves are worn and are very popular, especially for the warm weather, but it appears impossible to purchase a pair of silk gloves in any of the stores in Santiago or Valparaiso. Several types of cotton gloves in more or less successful imitation of suede are to be found, costing about $3.80 per dozen and retailing at $1.25 to $1.50 per pair. A favorite type for summer wear has the backs of a sort of net with closely knit fronts; these cost $3 to $4 per dozen and retail at $1 to $1.50 per pair. Suede gloves for men retail at $2.50 to $3.50 per pair in the same grades that were sold in the United States in the spring of 1916 at $1.50 to $2.25. An American and a French glove are two of the best-known makes and sell at $3 to $3.50 and up to $6 per pair for both suede and kid. Fine white jersey gloves to imitate suede sell at $1.50 per pair and the white cotton gloves for dress parade of the troops at 18 pesos (about $5.40) per dozen, a glove such as was sold in American stores at $0.25, about half the price here. Kid gloves cost $3.50 per pair in the better qualities of men's sizes and $1.75 in boys' sizes.

In women's gloves kids and suedes are the most salable, the former selling at $3 to $5 for short gloves and up to $10 for the directoire style. A glove made by Reynier Frères, 16-botton, can be bought for $5 and up. In suedes the short gloves sell at $4.50 and the four-button at $5.50. France supplies half of the leather gloves, while Germany has 75 per cent of the trade in cotton and 66 per cent of the trade in silk gloves. The latter is a small item, however, amounting to less than $10,000 annually. A silk glove, 12-botton, costs $3 and the 16-button $0.50 more; the short glove costs $1.75 to $2.

The share of the United States in the glove trade is negligible—in cottons, less than $500; in leathers, less than $5,000; and in silks, less than $20 in any of the three years taken for comparative purposes. Its entire share for the three years 1913 to 1915, inclusive, amounted to $9,020 out of a total of $180,541, or less than 5 per cent, a showing that might be greatly improved if an effort were made to introduce American goods. The great need in American foreign commerce is a series of American distribution stations where American goods will be featured. Then it would not be necessary to depend on foreign distributors, whose chief interest, aside from personal gain, is to increase the sale of goods from their own countries.

HOSIERY.

Most of the hosiery was formerly obtained from German makers. England supplied a good quantity and the United States comparatively little. The American share of the cotton knit-goods trade for 1913 amounted to some $33,000, out of total imports of nearly $826,000, while Germany furnished goods to the amount of over $588,000. The most serious complaint heard relative to American hosiery was that it is seamless and the trade in Chile is strongly in favor of the full-fashioned hose, though a few men expressed themselves as much preferring seamless. The ordinary sock that could be bought before the war at two pairs for a quarter in the United States is sold in Santiago at 2 pesos per pair (about $0.60), while a sock that cost $3.75 per dozen in June, 1917, is selling at 3 pesos per pair ($0.90). Women's stockings are extremely high in price, a silk stocking that could be bought in the early part of 1916 in any of the New York or Boston department stores for $2 selling in Santiago in September, 1917, at $6.50 per pair. Two samples of French silk hose are included in the samples submitted with this report, one of them costing $10.50 per dozen and retailing at $4.50, the other costing $13.40 per dozen and retailing at $6 per pair.

Fancy socks are much worn—colors, stripes, checks, plaids, and clocks, as well as those made of twist or printed yarns. The cheaper grades are made without reinforced heel and toe, but all the better types have this feature. Some few have a thread of linen for reinforcing, but most of them simply run an extra thread of cotton for this purpose. Nearly all socks worn by the laboring class are made locally and not especially well. For winter wear the black sock leads by a wide margin, the cheaper numbers, from $0.50 to $0.75 per pair, commanding the greater distribution. Japanese socks are coming to the front rapidly in the very low-priced lines; it is possible to buy them at about $1.75 per dozen, a price much lower than that of socks of equal value from any other country. The

Japanese socks are not so well made as the socks from other countries, but the price factor is all important with the working people. Aside from these Japanese socks, the lower grades are all of local production, one of the larger mills near Santiago turning out a very serviceable article at $1.50 to $1.75 per dozen in the natural color that is used almost exclusively by the workmen of the country. This factory also supplies the Army and Navy with all their hosiery requirements.

The total imports of woolen hosiery for 1913 amounted to about $75,000, according to the official statistics, based on valuations varying from $1.825 to $3.65 per kilo, inclusive of immediate wrappings. This does not give a very accurate idea of the number of dozens imported nor of the value, as there is no means of determining the relative amounts of the different sizes, weights, or qualities. Lack of heating arrangements in the houses induces the wearing of heavier clothing during the winter than is required even in sections of the United States that are colder than the most densely populated part of Chile, and woolen stockings are much more commonly worn than is the case with us. Men, women, and children who can afford woolen hosiery wear it quite generally during the cooler months. Most of these stockings were formerly supplied by the United Kingdom and Germany, and the former country has a practical monopoly of the trade since war conditions have cut off German supplies.

Most of the woolen goods are relatively fine gauge or cashmere for regular wear, the women's stockings selling for 9 to 12 pesos a pair ($2.70 to $3.60), according to weight and quality, the misses' sizes running about $0.25 per pair less in the same qualities. Men's socks sell for $2 to $5 per pair, the boys' sizes averaging $0.35 less in parallel grades.

Though outdoor sports are not so popular in Chile as in the United States there is more or less demand for sport clothing and hosiery. Baseball is played on the Fourth of July by the members of the American colony in Santiago, but it is not played by the Chileans, except by the few who may have learned the game in the United States. Association football, on the other hand, introduced by the English colony, has become fairly popular, though many of the players do not wear the regulation hose. Golf is making some headway, but very slowly; few of the natives take to the game, and the foreign colonies are so small as to make the demand for special hose a negligible item. The devotees of this sport obtain their hose from Great Britain and it would be useless to attempt to obtain the slight trade that exists. Cycling is popular with many of the young men, but there are relatively few who wear the short breeches and woolen hose for this sport. The largest outlet for the outing hose is the boy-scout organization, though many of these boys come from the poorer class and are forced to content themselves with ordinary stockings instead of buying the regulation type.

The following incident illustrates a feature all too common in dealings with American merchants and manufacturers, which is doing much to injure the prospects of a permanent trade. Some American hosiery was introduced in the Santiago market by a Scotch house, which has put forth no little effort in bringing it to the favorable notice of its clientele, anticipating that the sales would be confined at least to a few houses. Since the first sales were made two other reputable houses have put in the same line of hosiery, and now one of the smaller wholesalers is hawking it around the city, with the inevitable result that the first-class concerns will drop the line and the sales will decrease, while the factory will be at a loss to account for the lack of permanence of the market. It is unfortunate that such errors of judgment should occur as frequently as they do, for they tend to create the impression that business is conducted in a more or less haphazard manner by American exporters. One of the often repeated remarks made by the Spanish buyers is that certain houses are not serious; in other words, they do not conduct their selling campaigns in these countries according to the highest type of business ethics, a complaint that too often is founded on fact.

The hosiery business in particular has suffered from lack of care in making sales; irresponsible persons have been permitted to handle sales, and there has been a woeful disregard of the consequences resulting from indiscriminate selling without proper investigation of the business standing of the buyers. When the disruption of trade with the former sources of supply occurred there was an exodus to the United States of sharp traders, who bought up all sorts of merchandise (jobs and seconds), came back to the South American countries, and offered the goods at prices that seemed attractive to the merchants without stating that the goods were jobs. The inevitable result was numerous claims from the consumers and the sale of the balance of the stock at prices that usually netted a considerable loss. The entire transaction detracted from the prestige of American goods. The writer has personally seen many instances of such dealings, and, though the retailer in most instances understands that the goods were sold by the factory as seconds, there is an underlying sentiment that they should have been plainly marked, so that there would have been no opportunity for mistake. Such occurrences have made strong talking points for some of the not too scrupulous salesmen of foreign concerns, who do not hesitate to tell their customers that this is the type of merchandise they may expect to receive if they buy from American sources. One German house plainly marked such a lot of goods "Calcetines Americanos" and offered them at very low prices on the bargain counter. They were very careful not to advertise a line of firsts, also from the United States, as "Americanos," but conveyed the impression that they were of German make and therefore superior.

Short socks are the universal style for little folks in the central section of the country, even during the colder months, and it is not unusual to see the parents with overcoat and furs walking with a child wearing socks but little above the ankle whose little legs are blue with the cold. This seems to be the custom for both boys and girls up to 10 or 12 years of age. The favorite color for children is white, probably 75 per cent of them wearing socks of this color, but for the little girls there is a good demand for pinks and blues. Boys and girls up to 3 or 4 years of age wear white socks with a couple of stripes of color near the top, and the older ones use solid colors entirely. Above the age mentioned blacks are more in favor, or if tan shoes are worn, the socks may be of the same color. The socks are usually kept in place by a narrow elastic band placed around the leg—not webbing as a general thing, but an ordinary elastic such as is used for keeping papers or other small articles secure. The prices of these socks vary with the size and quality from 1.50 pesos to 4 pesos per pair ($0.45 to $1.20). Most of the socks are of French and English manufacture; practically none of them come from the United States, and for the last year none have come from Germany, which before the war furnished a large share of the total.

Misses' stockings are for the most part black, in ordinary grades of cotton and lisle, with very few silks. For summer wear there is a demand for the very lightweight goods, some of them mercerized but for the most part made of ordinary yarns. The popular-priced numbers range from 3 to 5 pesos a pair (about $0.90 to $1.50), but there is a demand for cheaper goods as well as for the finer qualities. The local mills supply a considerable share of the cheaper lines, but the better grades are all imported. The United States has gained considerable trade in hose that is bought at $3.50 to $5 a dozen and sells in Santiago at 3 to 8 pesos per pair (about $0.90 to $2.40). A few American brands are well known in the market and are called for by name, owing to the fact that they have been well advertised and above all to the fact that they have given excellent service.

ATHLETIC GOODS.

The foreign colonies have succeeded in introducing some of the sports common in European countries, and there are flourishing tennis clubs, golf clubs, football clubs, and hunt clubs in several of the cities. These clubs have naturally created a demand for garments appropriate to the sports, and in the better-class stores of any of the large cities one can find a fairly good assortment of sport clothing and accessories. Most of the riding clothes for men come from England in khaki, bedford cords, or cheviots. A well-made suit of bedford cord costs 50s. ($12.16) and sells for 140 pesos ($42); the cheviots cost 28s. to 42s. ($9.25 to $10.22) and sell at 125 pesos ($37.50). Tennis has grown very rapidly in favor, with a resultant increase in the demand for appropriate clothing. The favorite costume is a striped blazer, flannel shirt with attached collar, and white trousers, usually of serge. The blazers cost 10s. to 12s. ($2.43 to $2.92) and sell at 30 pesos ($9), and the trousers cost $3 to $4 and retail at 35 pesos ($10.50). There is a limited demand for better trousers, costing $5, which sell at about 35 to 50 pesos ($10.50 to $15).

Combination gymnasium suits are very scarce in the market at present, and inquiries are heard every day as to when a supply may be expected. These come from England, invoicing at $3 to $4 per dozen, and retail at 4½ to 6 pesos per suit ($1.35 to $1.80). Most of them come in white. Sweaters are used extensively for sport wear, mostly in whites, with a smaller number in maroon, grays, and blues. Most of the sweaters are of the coat type, though there is a limited sale for tubular goods. Nearly all the sweaters are in rather light weights, from 9 to 12 pounds per dozen, costing $20 to $24 in all wool and $15 to $18 in merinos or pleated goods. These sell at 15 to 40 pesos ($4.50 to $12), according to weight and quality, the $24 goods selling at 36 pesos ($10.80). Jersey sweaters are in less demand than the tuck-stitch and the shaker but are sold in fair quantities. In women's goods the fancy stitches far outsell any other type, except in the silks or fiber goods. Many of these are plain knit, with collar and sash, made on the Norfolk model; they cost $48 to $60 per dozen and sell at retail for $15 to $20 each.

The demand for caps is limited strictly to sales for sport wear, no one wearing a cap during business hours. The favorite cap material is a coarse cheviot or cassimere. None of them match the suit. Occasionally a boy may be seen wearing a blue serge cap, but most of them wear felt or straw hats, according to the season. Caps are imported from England at $3.50 to $6 per dozen and retail at $1 to $2 each.

WATERPROOF GARMENTS.

Imports of waterproof garments into Chile are practically negligible, the total for the year 1913 in both cotton and woolen goods amounting to only $27,000. Most of these came in not sewed and were made up in the country. These garments are sold chiefly in the seaports and in the southern section, where rains are more frequent than in the northern and central parts. As the population is largely grouped in the fertile central region, the market for such goods is much restricted, and practically none of the stores in any of the cities of this section stock waterproof garments. As a general thing it is safe to put down anyone wearing a raincoat as a foreigner. Even in the seaports the stocks of such garments are very small. The chief sources of supply are usually Great Britain and Germany, but in 1913 the United States furnished a larger share of the made-up garments than did Germany.

There is an occasional call for the so-called rain-proof coats in the regular overcoats, but this demand is so small that no store pretends to stock them, nor is it at all probable that the rain-proof feature would greatly assist the sale. In the country the use of the poncho is general, and these are sufficiently repellent to afford all the protection from rain that is desired; in the cities it is the custom to carry an umbrella and wear an ordinary overcoat. During the present season (1917) a number of waterproof garments were imported and proved to be a drug on the market, the importer finally selling them out at a loss in order to get rid of the stock.

MERCHANDISING METHODS.

The predominance of the European countries in the Chilean apparel trade is due to the fact that all the important houses in this line are owned or managed by Europeans, who naturally turn to their own countries for their supplies of merchandise, seeking lines with which they have become familiar while learning the business in the old country and buying from firms with which they or their employers have had business relations, in some cases extending over a long period of years. Another factor that has much to do with determining the trend of trade is that nearly all the concerns are partnerships, and one of the partners makes a visit to his old home every year, leaving the other in charge of the business. The partner on vacation combines business with pleasure and visits the markets, getting in touch with the situation in the primary market and obtaining new ideas as to desirable merchandise. By alternating the vacations each member of the firm not only comes back to the business with new vigor, but in addition becomes familiar with the new cloths, colorings, and styles, so that he can purchase intelligently. The larger houses, like the Casa Francesa, Gath & Chaves, and Casa Muzzard, have buyers constantly in the European markets and are posted up to the minute as to styles and fabrics, besides being on the spot to improve any opportunity for picking up desirable lots of goods.

These large houses, handling the greater part of the apparel, aside from knit goods, buy nothing in Chile, but deal direct with the manufacturer instead of with the importing houses, leaving only the small concerns, whose purchases are of relatively little importance, as customers of the importing wholesaler. The secret of the success of the German, French, and English in Latin American trade lies in the number of distributing houses controlled by their nations in the various countries of South America. If the United States is to assume the position in world trade that rightfuly belongs to it, a sales campaign should be mapped out on the most approved lines, which would eliminate dependence on persons or firms that have at heart not the increase of American commerce but rather its suppression and an increase in the sales of their own compatriots. It will be an uphill task to increase American sales abroad extensively and permanently until American exporters and manufacturers learn that the way to sell American goods is by means of American salesmen and in American stores. Any other method, though it may appear successful for a short time, is foredoomed to failure, as there is the instinctive feeling that the business should go to fellow countrymen of the salesman or merchant. Many of the merchants interviewed have reluctantly admitted the superiority of many lines of American articles, but the greater value of the merchandise is not sufficient to make them stock American goods in place of those from their home country. How does the merchant know that American shirt waists would not sell in Chile if he has never stocked the line and given his customers an opportunity to pass judgment on them? An experience of a returning traveler from the United States goes far to prove that these articles would find a market. A dozen waists of various kinds among her personal effects have been the envy and admiration of her friends and acquaintances, including many Chilean women, all of whom expressed a desire to purchase similar waists.

American goods do not sell in Chile only because of lack of opportunity, not because they are not adapted to the market requirements, are too costly, lack style, or fail in any of the other respects that are mentioned by the merchants as excuses. Why expect a French, English, or German house to exploit American-made goods instead of those made in their own countries? Yet the great majority of American manufacturers place their agencies with such houses and seem surprised that the results are not all that might be desired.

More important to the United States than the temporary increase of trade due to the inability of the merchant to obtain his goods from accustomed sources are the permanent results that will accrue from the visit of the wealthy Chilean to the United States instead of to France or England. He will become accustomed to American merchandise, see for himself the type of goods turned out by American mills and the displays in the windows of the fine American stores, and when he returns he will demand from his merchant American goods. If the

Chilean merchant would come to the United States for a visit, to see what we make and how we make it, there is not the slightest doubt that American trade would show a substantial increase.

The wearing-apparel trade is conducted on lines distinct from those employed in the other branches of textiles, and methods that have been found satisfactory in the distribution of piece goods and notions will not apply equally well to the problems confronting the manufacturer of clothing, though they might be used with some degree of success in the sale of shirts, collars and cuffs, hosiery, and underwear. In seeking to introduce these items, which more properly come under the head of furnishings, it is entirely feasible to make use of one or more of the several methods that are usually employed in the distribution of piece goods or other types of merchandise—the export commission house, the resident agent, the branch office, or the native representative. All of these meet with more or less success, depending on the class of representation. But the marketing of ready-made clothing demands special methods of merchandising if the best results are to be obtained. As noted in the previous section, the buying is done by representatives of the Chilean houses located in the primary market, where they are in constant touch with the style situation and are able intelligently to direct the buying and furnish the department heads with all the latest ideas. Practically none of the purchasing is done in the store, so that the visit of a traveler with samples would be of no avail unless arrangements could be made to have the buyer present, which would require negotiations a long time in advance of the proposed visit. It would be much better to undertake a propaganda trip some time between seasons when the buyers are at the stores and persuade them to visit New York when on their way to European markets, and thus convince themselves that American manufacturers are in a position to supply them with the merchandise they require. Probably the sales made on the first trip of a salesman would not be large enough to pay expenses; but if the buyers could be induced to look at the lines and become interested, they might visit American markets and later become good customers. In no branch of the ready-made clothing trade is the business of sufficient magnitude at present to warrant any great expenditure of time or effort even were it possible to capture the whole trade, but when it is considered that only about one-fourth of the population are the buyers of the present imports the potential market appears more attractive. The type of clothing turned out by high-grade American manufacturers should easily supersede the greater part of the made-to-measure garments, because it is superior in style, fit, and workmanship.

SELLING METHODS.

The ideal method of selling wearing apparel to the Chilean retailer would be to induce buyers to visit American markets, but there are several other means of bringing American products to the attention of the buyers, all of which are capable of producing more or less satisfactory results. One method that has been worked out satisfactorily by French houses is the display of samples and catalogues in special rooms—the method employed by "Aux Galeries Lafayette" and "Printemps." These concerns have offices in several of the larger cities where samples are displayed, including a few models of the latest creations and a full line of the fabrics and trimmings, with illustrations of the garments, in charge of some one who is conversant with the making of the goods and can give the prospective customer a good idea of the effect that will be produced by the use of the different cloths or combinations in any of the models. Nothing is sold from stock, but orders are taken, to be made up if necessary, or from the stock of the Paris house, to be delivered within a certain specified time. Houses like these have thus built up a very profitable business somewhat on the line of the mail-order house but not depending on catalogues alone.

Mail-order business is not greatly developed with houses outside of the country. Few aside from members of the American colony attempt to obtain their requirements in this manner. Two of the largest concerns in Chile issue catalogues for use in the Provinces and have found that excellent results are obtained by this means. Copies of the catalogues of both these houses for the spring season have been forwarded with this report.

American catalogues are seldom seen unless in the hands of some one of the American colony who is familiar with this section of the trade in the United States. It would seem feasible for one of the large American operators to establish offices in some of the larger cities, something on the lines followed by the French houses mentioned, and to obtain a business that in the course of a few years would prove very satisfactory.

The ideal method of conducting a selling campaign in this country would be by the establishment of a branch house in one or two of the principal cities, such as Santiago and Valparaiso, where a full assortment of goods would be on display at prices that would show a very satisfactory profit and yet be lower than the prices charged by the local importers and manufacturers. Such a branch should be preferably in charge of an American who has a thorough knowledge of the idiom in which the negotiations are to be conducted and, if possible, one who has had experience in Chile. The manager at least should be American; the employees might well be natives or Chilean born. Such a house might be founded by a combination of several noncompeting concerns and the expenses prorated according to the sales of various lines represented or in some other manner to be decided on by the interested firms. With such an organization it would be possible to accomplish much in the way of increasing American sales.

Agencies in some instances give very good results, but great care should be taken in selecting the person or firm to be intrusted with the responsibility of making a market for a manufacturer's product or the sales will not warrant the trouble. Instances are not unknown of an agency being sought simply to bottle up a competitive line rather than make any attempt to sell the goods. Before an agency is placed, the applicant should be well investigated with reference not only to his financial responsibility but to his methods of conducting business, the lines carried, whether allied or competitive, and many other details that will suggest themselves to the business man. This method of operating entails less expense than the maintenance of the branch house but is seldom productive of as good results. In any line that can draw a considerable volume of business the branch house is the better method of caring for the needs of the market, as it places the buyer in closer contact with the producer, always a desirable feature, and permits much closer cooperation between producer and distributer. Lack of such cooperation is one of the great disadvantages accruing from selling through intermediaries, whether agents, export commission houses, or exclusive representatives.

For the small exporter the expense of the branch house is prohibitive and one of the other methods must be resorted to. Probably placing well-selected agencies rather than the export commission house would be the best solution of the problem for the manufacturer of apparel. In making the choice of a person for the agency several points must receive careful attention. The relative advantages must be considered of appointing agents who shall act as wholesalers for a district or for the whole country and of appointing those who will have simply the exclusive sale at retail in the larger centers; each method has its advantages. In the case of a general agency much of the detail work connected with the billing and shipping will be avoided and the question of credits will resolve itself into a single factor. If the latter type of agency is decided upon, care must be used to select a person or firm that has a competent corps of salesmen covering the entire territory, and one that has not too many other lines that may conflict in price, style, or quality.

For the apparel trade the salesman from the home office is not so likely to obtain the desired results as one who is permanently in the field or who spends the greater part of his time in the country. This statement is perhaps rather broad and should be qualified as not applying to such nearly staple articles as hosiery, underwear, and collars and cuffs but only to the lines in which there is a greater variation in style from season to season. There would be a distinct advantage, however, in having a salesman from the home office visit the trade from time to time to cooperate with the local representative or agent, putting him in touch with the latest developments and showing the desire of the home office to assist in every possible way to market the product.

CREDITS AND CREDIT INFORMATION.

European merchants have had a decided advantage over their American competitors in the matter of obtaining accurate information as to credits, owing to the number of foreign banks in the different countries and the absence of American financial institutions. Most of these banks, in addition to carrying on the strictly financial functions of such institutions, have more or less well organized departments to care for the distribution of credit information among their clients. Inquiries from American merchants or bankers were answered in a rather perfunctory way merely as a banking courtesy, while the answers to similar inquiries from the bank's nationals were as nearly complete as possible, giving not only the exact information asked for but all other pertinent facts relative to the concern inquired about—the approximate amount of business done, reputation for prompt payment, business methods, and a vast amount of other data invaluable in forming an estimate of the desirability of forming a business connection with the concern in question. The difficulty encountered by American concerns in obtaining the needed information tended to discourage many from entering the export field. Now, however, the establishment of branches of American banks in several of the South American countries affords American merchants facilities equal to those enjoyed by their competitors. The bugaboo of long credits on doubtful information no longer frightens the would-be exporter, as he can easily ascertain the standing of any merchant in the Latin countries. In addition, long credits are much less common than was the case four years ago, many of the merchants maintaining a balance in New York banks for the payment of American accounts and a large percentage of the others accepting short-time drafts payable in American gold.

FINANCING EXPORTS.

There are various methods employed for financing an export business, each of which has its advantages, none of them being the "best" in every circumstance. Each manufacturer or exporter will have to study the requirements of his individual case and adopt the system that seems to fit the special requirements of his problem. A number of buyers are willing to make their purchases cash against documents, others prefer to accept a 30-day draft from arrival of the merchandise, and a few are willing to pay cash on acceptance of order or delivery of goods to some accredited forwarding agent in port of shipment. Those who require open account are very few, and it would be unwise for the exporter with limited capital to undertake business with such houses. Many American manufacturers prefer to work through export commission houses, a method that has many features to recommend it and also has several disadvantages. This method of exporting relieves the manufacturer of all responsibility as to credits, but in many cases restricts his distribution to a considerable extent and removes that most vital asset, contact with the customer, the personal touch that is influential in building up a permanent clientele. In this method of conducting an export business the manufacturer simply follows the instructions of the exporting house as to shipments and packing, billing the goods to the exporter and receiving his payment on delivery or 30 days thereafter. Usually he has no knowledge as to the final destination of his product and is handicapped if he later attempts to do a direct exporting business, because the exporter has marketed the goods under a trade name that is the property of the house. The manufacturer thus finds himself confronted with the task of introducing a line that is entirely unknown to the buyers, though they may have used the identical goods under another name.

Cash against documents is a system of financing that means for the customer practically cash on delivery, as the documents are forwarded to some designated bank and payment must be made in order to obtain the documents and secure delivery of the merchandise. This method is often used in dealing with a new customer and is found very satisfactory. Cash with order or on delivery of the goods to the forwarding agent at port of shipment is the method that appeals to the manufacturer, but it is not always feasible for the small operator, as it requires a larger capital than either of the other methods. The goods must be paid for at least a month before delivery can be expected, and in some instances two months elapse before the purchase is available for distribution. A much more equitable method is that involving an acceptance at 30 or 60 days, as it permits the exporter to obtain cash for the goods yet gives the importer an opportunity to dispose of at least a part of the importation before the accepted draft is presented for payment. Placing foreign acceptances on the same footing as domestic would be of great assistance in increasing American trade with the Latin-American countries, as the easier terms granted by the European countries have had no little influence in determining the course of trade. In fact, this feature and the establishment of the many houses owned or controlled by Europeans together explain the European dominance of these markets.

PACKING AND MARKING.

So much has been said and written on packing and marking that it would seem unnecessary to spend much time on them here, but not all American exporters have learned how to pack their goods so that they will arrive in good condition. This fault is not confined to American exporters, however, whose packages average as well as those from the European countries. Special care should be observed to make the cases strong enough to stand the unusually severe usage given them in nearly all the west-coast ports. Dock facilities are practically nil, the greater part of the merchandise being unloaded into lighters in the open roadstead by stevedores who seem to have no idea of the fragility of cases, treating them all alike, whether they contain paper, foodstuffs, or glass. Goods liable to water damage should have a wrapping of waterproof material, as at times the cases are exposed to the torrential rains that occasionally occur in a few of the ports. Usually the importer will give specific instructions as to packing if the goods are likely to meet with abnormal conditions, and in such cases the instructions should be followed to the letter, regardless of the opinion of the shipper, as the importer is in a better position to determine the special requirements of the case. Much of the criticism of American packing is without justification. Most American exporters put up their goods as well as those of any other country, but there is a tendency toward too much marking, which is a material aid to thievery. Cases should be constructed so that clandestine opening on board ship or lighters is rendered as difficult as possible, and all marks tending to disclose the nature of the contents should be avoided, particularly on cases containing shirts, collars, cuffs, waists, or any other article readily concealed, as pilfering is usually confined to the smaller goods. All cases should bear the serial number and identification marks that will insure delivery to the consignee, the weight, gross and net, and the dimensions, but nothing further except perhaps the routing.

LOCAL MANUFACTURING.

The industrial statistics of Chile are incomplete, not alone in the number of establishments, employees, value of products, raw materials, etc., but in information as to the equipment of the various units, such as is readily obtainable in the United States or European countries. The Sociedad de Fomento Fabril, primarily concerned with the industrial development of the country, publishes an industrial roster purporting to give a complete list of the manufacturing establishments, but many concerns are not listed, and the data given are of little value, as they are neither detailed nor accurate. In addition to this publication, a copy of which is forwarded with this report, the Central Statistical Bureau publishes each year a Statistical Abstract, containing much interesting information but also incomplete. The figures in the accompanying table were compiled from the latter publication; though inaccurate, they are the best that can be obtained. From a study of the tables given, it would appear that there has been a radical decline in the number of industrial establishments during the three years ended in 1914, those engaged in the manufacture of ready-made clothing, for example, decreasing from 13 to 2, and the number of employees from 3,519 to 153, while the lingerie shops entirely disappeared. This is manifestly inaccurate and is explained by the statement that many establishments fail to send in their reports.

The following table gives the figures published in the Statistical Abstract of Chile for the number of factories, the total investment, the total production, and the number of employees in various branches of the ready-to-wear clothing industry in Chile, during the years 1912, 1913, and 1914. Conversions were made at the rate of $0.20 to the Chilean paper peso.

Industries.	Number.	Total investment.	Total production.	Number of employees.
Shirt factories:				
1912	22	$900,000	$840,000	1,070
1913	28	295,000	958,000	1,141
1914	6	56,000	300,000	223
Corset factories:				
1912	5	328,000	437,000	466
1913	11	917,000	1,096,000	503
1914	5	59,000	151,000	148
Tailors:				
1912	575	2,689,000	2,790,000	6,351
1913	659	3,245,000	3,981,000	6,012
1914	110	425,000	2,085,000	2,302
Ready-made clothing:				
1912	13	2,027,000	2,789,000	3,519
1913	20	459,000	2,128,000	2,186
1914	2	33,800	470,000	153
Dressmakers:				
1912	104	470,000	671,000	742
1913	182	593,000	607,000	664
1914	4	6,000	103,000	126
Necktie factories:				
1912	2	53,000	74,000	40
1913	3	23,000	90,000	46
1914	....	....	....	....
Waterproof-clothing factories:				
1912	1	35,000	50,000	34
1913	1	....	....	....
1914	....	....	....	....
Lingerie factories:				
1912	2	92,000	131,000	160
1913	3	11,000	131,000	166
1914	....	....	....	....

In 1912 the "total investment" included liquid capital as well as real estate and machinery, while in the later years the cash capital was omitted, and in 1914 a further change was made in the method of compiling the data, the smaller industries being grouped separately. In 1914 there were 364 smaller establishments engaged in the manufacture of some sort of wearing apparel, with a combined capital of $554,000, consuming $534,000 worth of raw materials and giving employment to 1,662 persons.

MEN'S WEAR.

The principal manufacturing establishments in the men's wear branch are those devoted to the production of uniforms and located in Santiago. The most important of the establishments uses $300,000 worth of cloths from the United States annually—linings, light ducks, drills, etc.—but purchases the uniform cloths from local mills. The owner states that he would not buy from foreign sources if the local mills can supply the goods, even were prices more favorable offered by the foreigner, as he considers it more important to assist in the development of the industries of the country than to make a slight saving in the cost of the uniforms. The factory is equipped with 350 Singer machines, employs about 600 operatives in the factory, and during busy seasons furnishes work to about 200 seamstresses in their homes. One of the great difficulties connected with any manufacturing enterprise in Chile is the labor situation, particularly the tendency of the operatives to fail to put in an appearance on Monday morning as a result of overindulgence in alcoholic drinks on Saturday and Sunday. This factory is unique in that it has eliminated trouble of this kind completely. The first offense meets with a reprimand and the second with an automatic discharge, no excuse being considered, so that it has become a proverb with the employees that one can be sick any day but Monday. Another factor in building up a competent and loyal force for this factory has been the installation of a savings system with a bonus feature. Each of the operatives is encouraged to save a part of the weekly wage and leave it in the office, where it draws 6 per cent interest. For every 4 pesos deposited by the operative a fifth is contributed by the owner, so that there is a double incentive to thrift. In addition, free medical attention is furnished in case of need, and a spirit of cooperation is encouraged by the collection of funds by voluntary contributions from the workers to assist in making up loss of wages due to the sickness of any of the force. This factory makes the uniforms for the Army and Navy.

Another factory in Santiago makes uniforms for the railroad employees, mounted police, and patrolmen, employing a force of 200 operatives at all times and in the busy seasons increasing this number to perhaps twice as many. The cutters are paid by the week, the operatives by piecework, some of them earning as high as 25 pesos per week. The office force and overseers earn from 100 to 400 pesos per month. The rates paid the operatives are from 1 peso for workmen's trousers to 1.80 pesos for the railroad officials' trousers; vest, 2.50 pesos; coat, 10 pesos, or 12 pesos for a double-breasted garment; overcoat, 16 pesos, or 18 pesos for a double-breasted coat and 2.50 pesos for a cape. There are four makers of men's wear, none of them large operators, the greater part of the product being workingmen's pants to wholesale at 9 to 15 pesos a dozen, the lower-priced garments made of casinete and the better grade, of corduroy.

None of the local mills has made any attempt to produce worsted goods; one of them keeps its equipment busy most of the time in the manufacture of uniform cloths for the Army, Navy, police, and railroad employees. The other mills make blankets, cassimeres, and tweeds, some of good quality and creditable in design, but greatly inferior in finish to those produced in the United States or European countries. A frequent complaint made relative to the native cloths is that they do not retain their shape when made up; the garments bag at the knees, stretch at the elbows, and generally lose their shape much more rapidly than those made of imported goods. Probably some of these complaints are due to the fact that the tailors, accustomed to the use of foreign shrunken cloths, "needle-ready," as they are sometimes termed, do not shrink the goods prior to making up, and it is more than probable that a portion of the criticism is due to the idea prevalent in every country that imported goods are necessarily better than the products of the local mill.

Samples of the uniform cloths produced by the mill at Tome are included in the samples forwarded with this report. (See Appendix.) The cloths formerly used for the police uniforms were dark blue, but the interruption of commerce with Germany and the difficulties attendant on obtaining dyestuffs from other sources have compelled the authorities to permit the use of other colors, and a dark mixture has been settled on as the most satisfactory for this purpose. This is a plain twilled cloth, 1.40 meters wide, weighing 550 grams per linear meter, and cost 9 pesos per meter when the last contract was placed, early in May, 1917. [According to the United States Mint the exchange value of the Chilean paper peso for the quarter ended July 1, 1917, was $0.245.] The uniform cloth, or "sarga," as it is termed, is that described; the overcoating, or "paño," is identical in color, but weighs 750 grams per meter and costs 13 pesos per meter. The mixture is approximately 5 per cent white and the rest of the stock black. These are made of native wool, about three-eighths blood grade, but the sorting is done by very low-priced, unskilled labor, so that the statement as to grade must be interpreted rather liberally.

WOMEN'S WEAR.

There are no factories producing women's cloaks and suits for the trade, this division of the business being confined to the large stores, which operate shops in connection with their retail establishments to supply their own needs. In these shops the models imported from France are copied in a variety of fabrics, and minor changes are made to differentiate one from the other. The largest two shops make up suits, coats, dresses, waists, and underwear, as well as men's wear and neckwear for both sexes. These shops are equipped with American machinery, very largely Singer machines, and turn out some very creditable work. They employ 400 to 500 operatives in the shops and have at times half as many more women sewing in their homes.

In addition to these concerns, which distribute their products direct to the consumer, there are several smaller manufacturers making underwear for the trade, though the business is not of large proportions. There are also several corset factories in which a considerable portion of the cheaper garments sold in the market is manufactured. The statistics of local production are of little value, as there is no means of checking up the returns made to the Government, and these are evidently far from accurate. The manufacturers apparently are much averse to giving out information as to their equipment or production, and in few instances are they willing to admit visitors to the works.

The average wage received by the men working in the various branches of the wearing-apparel trade is about $1 per day, the women earning about $0.50. The highest wages are paid to the men in the corset factories, about $1.40 per day. The highest wage earned by the women is paid to the operatives in the waterproof factory, $0.80 per day. From this figure the wages run as low as $0.30 per day for women making artificial flowers; the men in this industry earn $0.65 to $0.90 per day.

The average number of days worked in the year is 288, and the hours of labor are 9 per day. The Saturday half holiday is not general. The total number of employees in the wearing-apparel trade is stated at 14,016 in 1912, 12,155 in 1913, and as 3,632 in 1914. The figures for 1914 do not include 1,662 employed in the smaller shops. The reduction in number is abnormal, and though there is no doubt that it is in some measure due to the disturbed conditions resulting from the war it can not be entirely attributed to this cause. In fact, there is every reason to think that the number of employees is not radically less than in former years but that the difference in the figures is due in great measure to the very lax methods employed in gathering the data, several of the larger factories not reporting in the later years.

Appendix.—SAMPLES AND CATALOGUES.

Accompanying the foregoing report on the wearing-apparel market of Chile were two catalogues and a number of samples selected as representative of that market's demand for various types of clothing of both native and foreign origin. These may be seen at the New York office of the Bureau, Room 734 Customhouse.

Sample 1.—Silk petticoat; made in France; invoice price, 24.25 francs ($4.68); retail price, 74 pesos ($22.20).

Sample 2.—Bathrobe; made in France; invoice price 22.50 francs ($4.34); retail price, 73 pesos ($21.90); formerly sold at 61.25 pesos ($18.38).

Sample 3.—Knit shawl; made in France; invoice price, 107 francs ($20.65) per dozen; retail price, 25 pesos each ($7.50).

Sample 4.—Knit shawl, napped; made in France; invoice price, 12.50 francs ($2.41) each; retail price, 35 pesos ($10.50).

Sample 5.—Brushed sweater; made in France; invoice price, 7.45 francs ($1.44); retail price, 20 pesos ($6).

Sample 6.—Tuck-stitch sweater; made in France; invoice price, 21.25 francs ($4.10) each; retail price, 53 pesos ($15.90). This is made up with a military collar striped with white, white-striped cuffs, large pearl buttons, and belt with pearl buckle for ornament only, fastening with snap fasteners.

Sample 7.—Cotton waist; made in Chile; cost, $1.40; retail price, $4.

Sample 8.—Cotton waist; made in France; invoice price, $1.55; retail price, $5.25.

Sample 9.—Silk waist; made in France; invoice price, $7.10; retail price, $30. This is a very simple waist of crêpe de chine with machine-embroidered collar, cuffs, and front.

Sample 10.—Silk hose; made in France; invoice price, $10.05 per dozen; retail price, $4 per pair. This is the popular-priced article in silk.

Sample 11.—Silk hose; made in France; invoice price, $13.40 per dozen; retail price, $5.50 per pair. This is typical of the better grade of silk goods; it is made with a gusset at the toe to conform to the shape of the foot.

Sample 12.—Woolen hose; made in England; Morley's trade-mark, a wheel with wings; invoice price, $8.80 per dozen; retail price, $2.75 per pair.

Sample 13.—Cotton hose; made in France; invoice price, $3.57 per dozen; retail price, $1.10 per pair. This is the type of hose that sells in greatest volume. The foregoing are all women's full-fashioned goods.

Sample 14.—Misses' woolen hose; made in France; invoice price, $8 per dozen; retail price, $2 per pair. Not sold in quantity.

Sample 15.—Misses' cotton hose, heavy weight; made in France; invoice price, $4.10 per dozen; retail price. $1.65 per pair. Limited sale.

Sample 16.—Children's stockinette leggings; made in France; 12 buttons; invoice price, $9.30 per dozen; retail price, $3.75 per pair.

Sample 17.—Women's stockinette leggings; made in France; invoice price, $10.50 per dozen; retail price, $5 per pair.

Sample 18.—Corset; made in France; invoice price, $17 a dozen; retail price, $6.75 each. This is representative of the ordinary grades.

Sample 19.—Corset; made in France; invoice price, $13.80 per dozen; retail price, $6.50 each.

Sample 20.—Corset; made in France; invoice price, $26.80 per dozen; retail price, $10 each.

Sample 21.—Bolero (undervest); made in France; invoice price, $4.05 per dozen; retail price, $1.65 each. Sold in quantity for summer wear.

Sample 22.—Bolero; made in France; invoice price, $5.02 per dozen; retail price, $1.85 each.

Sample 23.—Woolen bolero; made in France; invoice price, $9.60 per dozen; retail price, $5 each.

Sample 24.—Woolen bolero; made in France; invoice price, $6.10 per dozen; retail price, $2.25 each.

Sample 25.—Cotton undervest, elastic knit; made in France; invoice price, $2.50 per dozen; retail price, $1 each.

Sample 26.—Woolen undervest; made in France; invoice price, $9.94 per dozen; retail price, $3.97 each.

Sample 27.—Woolen undervest; made in France; invoice price, $7.10 per dozen; retail price, $2.50 each.

Sample 28.—Combination; made in France; invoice price, $14.35 per dozen; retail price, $6.85 each.

Sample 29.—Cotton union suit; made in France; invoice price, $8.70 per dozen; retail price, $4 each.

Sample 30.—Linen union suit; made in France; invoice price, $16.40 per dozen; retail price, $6.50 each.

Sample 31.—Woolen union suit; made in France; invoice price, $16.60 per dozen; retail price, $9.45 each.

Sample 32.—Woolen bloomers; made in France; invoice price, $18.40 per dozen; retail price, $7.75 per pair.

Sample 33.—Bloomers; made in France; invoice price, $8.82 per dozen; retail price, $2.95 each.

Sample 34.—Jersey bloomers; made in France; invoice price, $4.30 per dozen; retail price, $2 each.

Sample 35.—Wool-jersey bloomers; made in France; invoice price, $7.60 per dozen; retail price, $3.98 each.

Sample 36.—Drawers; made in France; invoice price, $2.20; retail price, $8.

Sample 37.—Drawers; made in Switzerland; invoice price, $8.25 per dozen; retail price, $2.87 each.

Sample 38.—Drawers; made in France; invoice price, $3.15; retail price, $10.

Sample 39.—Corset cover; made in France; invoice price, $0.48; retail price, $2 29 each.

Sample 40.—Nightdress; made in France, invoice price, $16.20 per dozen; retail price, $5.52 each.

Sample 41.—Chemise; made in France; invoice price, $6.50 per dozen; retail price, $3.43 each.

Sample 42.—Children's waist and petticoat combination, woolen; made in France; invoice price, $6.30 per dozen; retail price, $4.85 each.

Sample 43.—Children's woolen combination; made in France; invoice price, $7.20 per dozen; retail price, $2.26 each.

Sample 44.—Misses' woolen combination; made in France; invoice price, $7.20 per dozen; retail price, $2.50 each.

Sample 45.—Women's combination, cotton; made in France; invoice price, $7.20 per dozen; retail price, $2.50 each.

Sample 46.—Misses' undervest; made in France; invoice price, $2.70 per dozen; retail price, $1 each.

Sample 47.—Children's undervest, woolen; made in France; invoice price, $3.84 per dozen; retail price, $1.72 each.

Sample 48.—Babies' knit linen jacket; made in France; invoice price, $2.08 per dozen; retail price, $1.15 each.

Sample 49.—Babies' woolen shirt; made in France; invoice price, $3.84 per dozen; retail price, $1.72 each.

Sample 50.—Cotton sock; made in France; invoice price, $1.95 per dozen; retail price, $0.57.

Sample 51.—Cotton sock with clock; made in France; invoice price, $3.10 per dozen; retail price, $0.86 a pair.

Sample 52.—Fancy cotton sock; made in France; invoice price, $1.10 per dozen; retail price, $0.43 per pair.

Sample 53.—French balbriggan drawers; made in England; invoice price, $4.35 per dozen; retail price, $1.86 each.

Sample 54.—Balbriggan shirt to match sample 53; made in England; invoice price, $3.75 per dozen; retail price, $1.86 each.

Sample 55.—Balbriggan drawers; made in France; invoice price, $4.55 per dozen; retail price, $1.60 each.

Sample 56.—Balbriggan shirt to match sample 55; made in France; invoice price, $3.95 per dozen; retail price, $1.60 each.

Sample 57.—Flannel shirt; made in Chile of English goods costing 14 cents per meter; cost of manufacture, $2.72 per dozen; retail price, $2.43 each.

Sample 58.—Shirt of French material costing 11.2 cents per meter; made in Chile; cost of making, $3.65 per dozen; retail price, $2.75 each. This and the flannel shirt are made with attached collars.

Sample 59.—Pleated-bosom shirt; made in Chile of a French zephyr costing 17.2 cents per meter; cost of manufacture, $3 per dozen; retail price, $3.32 each. Made with attached cuffs.

Sample 60.—White shirt with pleated bosom; made in Chile of French shirting costing 11.2 cents per meter; cost of manufacture, $3 per dozen; retail price, $2.14 each.

Sample 61.—Three popular styles of collars; made in France; invoice price, $0.90 per dozen; retail price, $0.514 each.

Sample 62.—Cuffs; made in France; invoice price, $1.70 per dozen; retail price, $7.71 per dozen or $0.70 per pair.

Sample 63.—Bow tie; made in Chile of French silk costing $1.50 per meter; retail price, $0.83.

Sample 64.—Narrow-end bow tie; made in Chile of French silk costing $1.50 per meter; retail price, $0.714 each.

Sample 65.—Four-in-hand tie; made in Chile of Italian silk costing $0.75 per meter; retail price, $1 each.

Sample 66.—Four-in-hand tie; made in Chile of French silk-striped cotton costing $0.38 per meter; retail price, $0.546 each.

Sample 67.—Four-in-hand tie; made in Chile of French poplin costing $0.22 per meter; retail price, $0.214 each.

Sample 68.—Four-in-hand tie; made in Chile of Italian silk costing $1.35 per meter; retail price, $1.86 each.

Sample 69.—Four-in-hand tie; made in Chile of French silk-striped cotton costing $0.42 per meter; retail price, $0.828 each.

Sample 70.—Embroidered handkerchief; made in England; invoice price, $1.936 per dozen; retail price, $0.486 each.

Sample 71.—Printed-border handkerchief; made in England; invoice price, $0.445 per dozen; retail price, $1.57 per dozen or $0.143 each.

Sample 72.—Men's handkerchief; made in England; invoice price, $1.215 per dozen; retail price, $2.65 per dozen or $0.25 each.

Sample 73.—Cord-bordered handkerchief; made in England; invoice price, $0.728 per dozen; retail price, $1.86 per dozen or $0.17 each.

Sample 74.—Handkerchief; made in England; invoice price, $0.584 per dozen; retail price, $1.574 per dozen or $0.15 each.

Sample 75.—Fancy-woven handkerchief; made in England; invoice price, $1.18 per dozen; retail price, $3.29 per dozen or $0.30 each.

Sample 76.—Initial handkerchief; made in England; invoice price, $0.702 per dozen; retail price, $2.215 per dozen or $0.20 each.

Sample 77.—Boys' suit; made in Chile of cloth costing $0.71 per meter; cost of manufacturing (labor cost), $1.72; retail price, $11.15.

Sample 78.—Men's suit; made in Chile of cloth costing $0.83 per meter; cost of manufacture, $4; retail price, $26. This is representative of the lower-priced suits, those of medium grade costing $35 to $50.

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U.S. DEPARTMENT OF COMMERCE

BUREAU OF FOREIGN AND DOMESTIC COMMERCE

B. S. CUTLER, Chief

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SPECIAL AGENTS SERIES—No. 169

INVESTMENTS IN LATIN AMERICA AND THE BRITISH WEST INDIES

By

FREDERIC M. HALSEY

Special Agent

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LETTER OF SUBMITTAL.

DEPARTMENT OF COMMERCE,
BUREAU OF FOREIGN AND DOMESTIC COMMERCE,
Washington, June 15, 1918.

SIR: There is submitted herewith a report by Special Agent Frederic M. Halsey on investments in Latin America (except Mexico) and the British West Indies. One of the outstanding facts in the foreign commerce of the great exporting nations has been the way in which such trade has been enlarged and stimulated by the investment of capital in the countries to which the goods are sold. Enterprises that owe their existence to foreign capital are naturally inclined to purchase equipment and supplies in the land of their financial origin. And, again, the willingness of foreign capitalists to assist in the development of a country's resources creates a favorable attitude on the part of that country's citizens and a receptivity toward other business propositions. Before the war the commanding position of European nations in certain Latin-American markets was due in large measure to their great investments there.

The realization of these facts has impelled the Bureau of Foreign and Domestic Commerce to undertake a comprehensive survey of the investment situation in this field, to the end that a larger amount of American capital may eventually find its way thither and a corresponding commercial advantage be derived. The Bureau appreciates fully the exigencies of war conditions and the undesirability of diverting capital at this time to foreign fields, yet it feels that preparation may properly be made for the expansion that will come after the termination of the war. By means of the present monograph it desires to place in the hands of American financial interests a succinct statement of what has been done thus far in the investment line.

Mr. Halsey has purposely avoided speculations as to the future or suggestions with regard to new, uncertain ventures. He has simply presented a record of present effort and past accomplishment. Each country is dealt with individually. Records of the national debts, and in some instances of State and municipal debts, are given, together with brief financial histories of the several countries. Railways and public utilities are discussed, as well as mines, farming activities, manufacturing establishments, and the other forms of enterprise that have attracted capital to the rich territory lying to the south. The financial statements of public companies are included in many cases to indicate some of the results obtained.

The statistical data and other information contained in this monograph are necessarily incomplete. It is, however, the hope of the Bureau that it will prove a concise manual of useful facts and the groundwork for future action or investigation. Almost without exception the statistics have been drawn from official sources, usually from annual reports of companies or statements furnished by the various Governments. All data concerning Government, State, and municipal obligations are presented without comment.

Certain of the illustrations have been made available through the courtesy of the Pan American Union.

Respectfully,

B. S. Cutler,
Chief of Bureau.

To Hon. William C. Redfield,
Secretary of Commerce.

INVESTMENTS IN LATIN AMERICA AND THE BRITISH WEST INDIES.

INTRODUCTION.

The Continent of South America, containing as it does extensive areas of undeveloped and partly developed territories, has proved a magnet for the investment of considerable amounts of foreign capital. Great Britain, France, Germany, Belgium, the Netherlands, and to a less extent, perhaps, the United States, have investigated opportunities in the southern continent and have successfully developed railways and public utilities, mines and manufactures, farms and cattle ranches, have purchased Government, State, and municipal bonds, and have otherwise made investments in the field. It is a matter of some interest (and perhaps significance) that Great Britain during the several months preceding the outbreak of the great European war placed larger sums in Argentina than in the United States.

The outbreak of the war in 1914 brought about an immediate change of conditions in the European investment markets. The conservation of the resources of the various warring countries and their neighbors immediately stopped the exportation of capital from Europe, and the Latin Republics became dependent on the United States for their needs financially.

Before the war the interests of the United States in South America, other than in mines and the packing industry, were negligible. During the lull that followed the closing of the various stock exchanges much attention was given to Latin America, and the first steps were taken to interest American bankers in the opportunities presented in that field. During the early months of 1915 a loan was made to Argentina by American investment houses, and the bonds were publicly offered with success. Other loans followed this one, and a number of shares in railways in Argentina were purchased by investors through London. Two short-term note issues of South American railways were afterwards floated in the United States, these being obligations of the Antofagasta. (Chile) & Bolivia Railway ($3,000,000), and the Central Argentine Railway ($15,000,000). Other investments (largely in mining securities) were made, including bond issues of the Cerro de Pasco mines, the Chile Copper Co., and the Braden Copper Co., operating in Peru (Cerro de Pasco Mining Co.) and in Chile. These three great mining properties, developed through the investment of American capital, have become the greatest mining properties in South America and rank among the most important copper producers in the world. American interests have also turned their attention to developing the petroleum resources of Venezuela, Colombia, and Peru, as well as the nitrate fields of Chile, the manganese deposits of Brazil, and other forms of enterprise.

Concerning the undeveloped wealth of the various South American countries, it may be said that minerals exist in all the Republics, that the forest resources of all (except possibly Uruguay) are very extensive, that oil deposits have been found in almost every country and are worked commercially in Argentina, Colombia, Chile, Ecuador, Peru, and Venezuela, and that there are lands available for the raising of live stock and for agricultural purposes. Although public utilities have been developed to a considerable extent, the vast amount of water power available assures a future of greater importance for this field of enterprise.

Great Britain has long been the largest investor in South America. The following table indicates the approximate amounts placed by that country in the various Latin American nations and in the West Indian Islands. The figures as submitted are said to be conservative:

Class and nationality of securities.	Amount.[a]
CLASS OF SECURITIES.	
Governmental, State, and municipal loans	$1,571,879,500
Railway securities, stocks, debentures, etc	2,350,519,500
Industrial, land, timber, oil, lighting, etc	1,265,290,000
Total	5,187,689,000
DISTRIBUTION OF INVESTMENTS.	
Argentina	1,897,935,000
Brazil	1,119,295,000
Chile	340,655,000
Uruguay	243,325,000
Peru	121,662,500
Venezuela	39,905,300
Colombia	33,578,900
Bolivia	17,519,400
Paraguay	14,509,500
Ecuador	13,626,200
Guianas	8,759,700
Total, South America	3,850,861,500
Mexico	798,106,000
Cuba	229,698,800
Guatemala	51,098,200
Costa Rica	32,118,900
Honduras	15,086,200
Nicaragua	5,839,800
Santo Domingo and Haiti	3,406,500
British Honduras	1,460,000
Porto Rico	2,919,900
Total, Mexico, Central America, and Latin West Indies	1,139,734,300
Shipping	97,330,000
Banks and trust companies	99,763,200
Grand total	5,187,689,000

[a] Converted at the normal rate of $4.8665 from round-sum estimates expressed in pounds sterling.

In addition to the above total, Great Britain has invested fairly large amounts in British West Indian, colonial, and other securities. The total British West Indian investments would probably approximate $60,000,000, including some $30,000,000 in colonial loans and upward of $20,000,000 in Trinidad oil securities. Thus the approximate total invested in governmental and municipal securities and in stock enterprises throughout South and Central America, Mexico, and the West Indies may conservatively be said to approach $5,250,000,000.

No figures are available as to the extent of French investments in Latin America. The amount placed in Argentina is said to total $400,000,000, and fully that sum has gone into Brazilian loans and enterprises; in fact, some estimates place the total amount of French capital in that field as high as $800,000,000. There is likewise French capital in practically all of the other Republics. The investments in Argentina include three railway lines with a mileage of approximately 2,500, Government bonds, banks, etc. The French have made loans from time to time to Bolivia, hold interests in mines, and have otherwise made investments in that Republic. French engineers are at present building a section of the railway link to connect the highlands of Bolivia with the railways of Argentina. The public-utility enterprises of La Paz, the capital, are under French ownership and management. Numerous Brazilian Federal and State loans have been floated in France, while a number of important railways, including a large interest in the Brazil Railway, are held by the French. Their investments in Ecuador, Colombia, Chile, and Venezuela have also been large. Possibly a fair estimate of French investments in Latin America would be $1,500,000,000 to $1,700,000,000.

Germany, with its chain of banks and its pre-war merchant marine, occupied an important place in Latin America. With the possible exception of its banks, the most important of its investments are in the public-utility field, the Compañía Aleman Transatlántico de Electricidad, of Buenos Aires, controlling the most important electric properties of that city, a tramway line in Montevideo, Uruguay, electric properties in Mendoza, Argentina, and electric lighting and street railway properties in Valparaiso and Santiago, Chile. These enterprises, collectively, form probably the largest public-utility group in Latin America. The Great Railway of Venezuela, from Valencia to Caracas, is the only German railway of importance, but German interests in other fields are numerous.

The Netherlands and Belgium are both owners of banks, Latin American Government loans, and other securities. The Netherlands holds probably the second largest block of shares in the Peruvian Corporation, while Belgium has always looked with favor on the "cedulas," or Government-guaranteed mortgage obligations, of the larger Republics. A large amount of Brazil Railway stock is also held by Belgian interests.

Canada has had a place in the field, its interests having been important in the development of the traction and electric-lighting properties of Rio de Janeiro and São Paulo, Brazil. Canadian public-utility companies are also prominent in British Guiana, Trinidad, and Jamaica. Italy, Spain, and one or two other countries also have Latin American investments, but their interests are not large.

The principal subjects discussed in the various chapters of this monograph are Government, State, and municipal loans, banks, railways, public utilities, insurance companies, manufactures, mines, shipping, forest products, and agriculture. In the appendix will be found income accounts of a number of companies (mostly such as are not included in the general discussion), quotations and dividend records of securities listed on the various stock exchanges, and other relevant data.

Part 1.—SOUTH AMERICA.

ARGENTINA.

INTRODUCTION.

Argentina is preeminently a land of progress. Thirty years ago its great natural resources were undeveloped and its rich soil virtually untilled. To-day, as a result of its steady, consistent advance, the Republic has come to rank among the foremost producing nations of the world. The greatest source of wealth lies in the magnificent pampas—grassy, treeless plains, stretching from the Atlantic to the foothills of the Andes and from the Gran Chaco to the far south. Within this vast area millions of bushels of wheat, maize, linseed, oats, etc., are produced, and millions of cattle, sheep, horses, and other domestic animals are raised. The country usually stands seventh among the nations of the world in the production of wheat, fourth in the area of wheat sown, and either first or second in the amount of wheat exported to other countries. The area normally under cultivation is estimated at approximately 17,000,000 acres, which, it is stated, is not more than one-fifth of the area available for the production of this grain. The maize production in 1915 amounted to 8,591,645 tons, valued at nearly $75,000,000, United States currency. The linseed production of Argentina is the largest in the world, amounting to approximately 1,700,000 tons per annum. Upward of 4,000,000 acres are under cultivation for linseed, as compared with approximately 10,000,000 acres for maize. The value of the agricultural production for the year 1915–16 was nearly $750,000,000.

The live-stock industry has assumed vast importance. There are at least 30,000,000 head of cattle, 80,000,000 sheep, 9,000,000 horses, and numerous other live stock in the country, valued at more than $1,250,000,000. There has been developed a vast export business in frozen meats, hides, wool, etc.

The total national production for 1915–16 was estimated at more than $1,400,000,000, this including animal products to the amount of about $500,000,000 gold. Argentina is usually spoken of as the richest nation per capita in the world, and this condition is the result of the great productivity of the farms.

With an area of approximately 1,137,200 square miles, Argentina had an estimated population in 1916 of 8,198,006, as compared with 7,885,237 in 1914, 7,171,000 (estimated) in 1911, and 3,995,110 in 1895. During a period of 20 years, therefore, the population has doubled. Buenos Aires, the capital of the Republic, has nearly 1,700,000 inhabitants. It is the largest city in Latin America and the most populous capital city in the Western Hemisphere. The city covers an area of more than 720 square miles, and is a marvel of splendor and luxury. Real estate sales in the city during a normal year exceeded $180,000,000 gold. Traction and subway lines have a total mileage of 455 and carry during normal years more than 400,000,000 passengers annually. As a port the city ranks second in the Americas and seventh in the world. Here, in the year 1913, there came from foreign countries a total of 5,137 vessels, of 13,818,646 tons, bringing 85 per cent of the nation's imports and taking 45 per cent of its exports. At Buenos Aires are located the terminals of the great railway systems of the Republic.

Statistics recently issued by the Argentine Government show that the value of the foreign trade of the country during the calendar year 1917 was $897,924,034 United States currency, of which $530,914,097 represented exports and $367,009,937 imports, leaving a net trade balance in favor of the country of $163,904,160. For the first time in the history of the country the statistics show actual c. i. f. values. Formerly fixed values corresponding to the Argentine tariff were used in computing these statistics. These values were fixed in 1898 and no longer represent actual values. The increase in the values of imports in 1917 over those of 1910, when actual values and fixed values were approximately the same, range from 5.7 per cent on silk goods to 259.2 per cent on china and glass ware. Since the beginning of the war the values of imports have increased 95.3 per cent and of exports 74.7 per cent.

The Argentine Government has rectified the total values of exports and imports for the years 1913, 1914, 1915, 1916, and 1917 to correspond to actual values, and these rectified figures are as follows: Imports—1913, $478,859,146; 1914, $311,241,415; 1915, $294,795,926; 1916, $353,316,001; 1917, $367,009,937. Exports—1913, $500,985,551; 1914, $389,021,914; 1915, $561,803,004; 1916, $552,994,539; 1917, $530,914,097.

A vast increase in foreign trade may be looked for when the European war is ended and immigration on a large scale begins again. Argentina, except in a few lines, had not enjoyed normal prosperity during the three or four years preceding the preparation of this report. This fact, with the lack of immigration, had, temporarily, somewhat checked the nation's progress. The boundless resources of the country and the wonderful fertility of the pampas assure, however, the future of Argentina. The Republic, as will be shown in these pages, has attracted vast sums of foreign capital in the past, and there seems little reason to doubt that it will continue to serve as a magnet for the money of investors.

SCOPE AND MAGNITUDE OF FOREIGN INVESTMENTS.

In the days before the great war the financiers of Europe watched with eager eyes for opportunities that might arise to place sums of money in the development of Argentina. Great Britain took the initiative and has long maintained first position in the field. An estimate recently made by the author of this report placed the total of British capital invested in Argentina at $1,897,935,000. About one-half of this sum has been used for the construction and operation of railways, including the most important lines in the Republic, and the remainder has been placed in Government loans, public utilities, land enterprises, sugar plantations, cattle ranches and meat establishments, banks, department stores, etc. A very large part of the national debt of Argentina is held in Great Britain, as are numerous provincial and municipal securities. The British-owned banks are a most important factor in the Argentine Republic, and an all-important aid to British trade.

France has placed, according to estimates by French bankers, upward of $400,000,000 in Argentina, including important investments in banks, Government loans, one large and several smaller railway systems, land enterprises, etc. German investments are next in importance, powerful Teutonic interests controlling public utilities that operate in Buenos Aires, Rosario, and elsewhere. German banks have in the past wielded great influence in Argentina. A number of large land and cattle concerns have also been financed by German capitalists. While figures are not available, it is reasonable to suppose that nearly $250,000,000 of German capital is invested in Argentina. These sums have been so carefully placed that great commercial advantages have been obtained by Germany.

The United States, with its banks, meat-packing concerns, and other undertakings, is beginning to be a factor in the economic development of Argentina. The conditions in the European money markets, due to the war, have caused the Argentine Government to seek several loans in the United States, and this has led to the establishment of much closer financial relations between the two countries. Possibly there is $100,000,000 of American capital in Argentina invested in Government loans, banks, public industrial enterprises, railway bonds, etc.

Fair-sized amounts of Government bonds are held in the Netherlands. Most of the external loans of Argentina are listed on the stock exchange at Amsterdam. Dutch capital is also invested in banking institutions, while an important steamer line of Dutch nationality maintains a regular service to the River Plate. Italian and Spanish capital is also present, mostly in banks. Belgian capitalists control certain banking institutions and hold some land investments.

Between $4,000,000,000 and $4,500,000,000 gold of foreign capital is invested in Argentina, according to an estimate made by Dr. Alberto B. Martinez, the well-known Argentine statistician, who delivered a lecture on May 31, 1918, before the Instituto Popular de Conferencias (Popular Institute of Conferences) on the subject of foreign capital investments in Argentina. Dr. Martinez divides foreign investments in Argentina as follows, the amounts being in gold pesos of $0.9648:

	Pesos.
Various Argentine loans and issues	657, 303, 460
Railways	1, 344, 326, 465
Banks	51, 891, 022
Ports	22, 163, 909
Tramways	109, 496, 149
Freezing establishments	40, 916, 439
Gas, electricity, water, and drainage companies	78, 373, 018
Land and rural property companies	79, 681, 618
Mortgages	500, 015, 962
Insurance	3, 886. 464
Industrial establishments	507, 760, 000
Telephone and radio-telegraphic companies	21, 340, 000
Commerce	465, 169, 244
Total	3, 882, 323, 750

Unless unforeseen conditions develop, the United States during the next decade will be the creditor nation for Argentina. Opportunities for the placing of capital in such a rapidly expanding country are presenting themselves daily and will continue to present themselves. American investors have shown themselves responsive to offerings of Argentine securities. Such offerings as have recently been made have been absorbed very quickly. Before 1915 and 1916 American investors had seldom looked across the nation's boundaries for fields in which to place capital. The general change in conditions brought about by the war was responsible for a new investment policy. American capital, forced for the first time to seek new outlets, turned not unnaturally to South America and in making its initial selection chose the Argentine Republic because of its advanced position among the southern nations.

The present report can only picture briefly the scope and magnitude of this investment field. However, the various phases of the field, such as railways, public utilities, governmental securities, industrials, etc., will be considered in a general way. Space will not permit an exhaustive study of each class of investments or the presentation of such material, for example, as complete data concerning the credit and national wealth of the Government, its railways, and other assets.

FEDERAL LOANS AND FINANCES.

Governmental loans of the Argentine Republic have long enjoyed wide favor among European investors. In pre-war days the bonds sold at a substantial premium, indicating the high credit of Argentina in the European markets. After the outbreak of the war the closing of the markets of Great Britain, France, and other countries brought about a decline in the market value of these bonds, and naturally compelled Argentina to pay a higher price than before for necessary funds. In view of the war, the Government has been obliged to retrench in many branches of its service and postpone the carrying out of certain improvements of a national character. Revenues from customs and other sources fell far below expectations, and the general business depression, which dated from a period shortly before the war, was so long extended that fears were expressed that governmental financial difficulties might arise. However, despite the financial uncertainty, the Government maintained its credit in a most praiseworthy manner and punctually met all obligations. The large grain exports of 1915–16 and the general demand for other products of the country naturally brought about an improvement in national credit; this was partially offset, however, by the crop failure of 1916–17.

Detailed information concerning the early financial history of Argentina will not be presented here. Its early financial history was not unlike that of other nations in the making, and difficulties were sometimes encountered.

In 1824 Argentina made its first external loan—£1,000,000 at 6 per cent, sold in London, by the Province of Buenos Aires, at 85 per cent. Interest was defaulted in 1830. In later years the Government recognized the loan and paid it off, converting its arrears of interest into bonds.

In 1863 and 1866, 6 per cent loans were floated, the first in Buenos Aires and the latter abroad, to meet expenditures to carry on the war with Paraguay. The first-mentioned internal loan was afterwards converted into 3½ per cent external sterling bonds, and the latter loan was extinguished through sinking funds in 1889.

In 1870 the Province of Buenos Aires sold £1,034,700 6 per cent bonds at 88 per cent. These bonds were recognized by the Government as an external loan in the year 1880. The outstanding portion of this loan and of the 6 per cent National Public Works Loan of the Republic (£6,122,400 bonds issued in 1871 at 88½ per cent) were converted in 1889 into 4½ per cent conversion bonds (see a subsequent paragraph). In 1873 the Province of Buenos Aires sold an additional £2,040,800 6 per cent bonds, which were subsequently converted into the 4½ per cent bonds mentioned above. This loan was originally offered for subscription at 89½ per cent and in 1880 was recognized by the Government as a part of its debt.

In 1876, $6,000,000 9 per cent treasury bonds were sold in Argentina. They were subsequently quoted on European markets. Most of these bonds were afterwards converted into external bonds bearing a lower rate of interest.

During the year 1881 a £2,450,000 6 per cent railway loan was floated in London and Paris at 91 per cent. There was a sinking fund of 1 per cent. The proceeds of the loan were used to provide funds for the construction of various railways, the revenues from the operation of these lines being pledged for the service of the bonds. In 1889 a large part of the loan was converted into 5 per cent debenture stock of the Cordoba Central Railway. The balance was subsequently extinguished.

A 6 per cent loan to the amount of £817,000 was issued in 1882 in London and Paris. The sinking fund of 2 per cent retired a portion of the loan and the balance was converted in 1889 into 4½ per cent conversion bonds. In 1884, £1,714,200 5 per cent bonds were offered in London at 84½ per cent, the principal to be paid off by a cumulative sinking fund of 1 per cent per annum. The bonds sold at 104 during recent years, and are now quoted at about 96. Approximately £850,000 remain outstanding.

During the years 1886 to 1889 several loans were floated and various earlier bond issues exchanged for bonds of the conversion 3½ per cent and 4½ per cent loans. These included the 5 per cent loan of 1886 and 1887, of which £4,000,000 were issued in 1886 and publicly offered by Baring Bros. & Co. in London at 80 per cent. In 1887 the same firm and J. S. Morgan & Co. issued an additional £4,290,000 of the bonds at 85½ per cent. The two issues are redeemable by a cumulative sinking fund of 1 per cent and are secured on customs duties. Approximately £5,000,000 of the two issues remain outstanding. In the same year (1887) a loan known as the Banco Nación (German) 5 per cent loan was floated in Germany. The loan was for approximately $10,000,000 o/s.[1] An accumulative sinking fund has reduced the total to about $7,000,000. These bonds are not quoted outside of Germany.

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[1] The Argentine gold peso, worth $0.9648 in United States currency, is designated by the sign $o/s, the o/s standing for "oro sellado" (coined gold). The paper peso, worth about $0.47 in United States currency on January 1, 1918, is designated by $m/n, the m/n standing for "moneda nacional" (national money). These signs will be used throughout the Argentine section of this report. When a figure is followed by either o/s or m/n it must be understood that the $ sign preceding it indicates Argentine pesos, *not* American dollars.

In 1887 Argentina made a slight adjustment of its finances by converting $3,582,315 o/s 9 per cent internal bonds into 5 per cent treasury conversion bonds at the rate of £20 10s. of new bonds for each $100 of the old bonds. This conversion called for the issuance of £624,000 new bonds. A total of £422,000 of these bonds remain outstanding.

During the years 188[illegible] to 1889 the Government adopted a program of railway expansion and began the construction of various lines in the northern sections of the country. In order to carry on these extensions there was authorized the Northern Central Railway extension 5 per cent Government mortgage loan to secure £3,968,200 bonds, which were issued, £1,300,000 in 1887 at 91½ per cent, £1,500,000 in 1888 at 94 per cent, and £1,168,200 in 1889 at 97 per cent. The bonds are secured by a mortgage on the railway extensions constructed with the proceeds of the loan. Like practically all of the external loans, these bonds are listed on the London Stock Exchange. Approximately £2,700,000 of the loan remains outstanding. The accumulative sinking fund is 1 per cent per annum.

In 1889 a 4½ per cent loan was authorized. Although this was classed as an internal loan, a large proportion of it was offered in Europe at 87 per cent. Its total amount was £3,933,580, and its purpose was to fund debts previously contracted at a higher rate of interest. Approximately £2,700,000 of the bonds remain outstanding.

In the same year the Government authorized two conversion loans in order to fund certain loans issued at an earlier date bearing high rates of interest. These loans bear interest at 4½ per cent and 3½ per cent, respectively, and were issued as follows:

(1) The 4½ per cent loan for £5,290,000 for the purpose of repaying the 6 per cent loans of 1871 and 1882, as well as the 6 per cent loans of 1870 and 1873 of the Province of Buenos Aires; this loan was offered for public subscription at 90 per cent. The accumulative sinking fund of 1 per cent per annum has reduced the total outstanding to approximately £3,700,000.

(2) The 3½ per cent loan for £2,659,500, of which approximately £1,500,000 remains outstanding. These £2,659,500 bonds were given in exchange for $12,973,200 internal bonds bearing higher rates of interest at the rate of £20 10s. new bonds for each $100 gold bonds.

In 1890 there were issued £2,976,000 5 per cent railway bonds, known as the Northern Central Railway loan. These bonds were not publicly offered until a number of years later, but were used as collateral for other loans of a temporary character.

PLAN OF READJUSTMENT AS RESULT OF CRISIS.

In the same year the Republic underwent a serious economic and financial crisis, and a committee was appointed by the Bank of England to work out some plan of readjustment. Through the efforts of this committee it was arranged that the Government of Argentina should continue the service of the loans outstanding in the following manner: (1) Loan of 1886–87, interest and sinking fund in cash; (2) all other loans, service of interest and sinking fund from January, 1891, to January, 1894, in 6 per cent funding-loan bonds, secured upon the customs receipts of the Republic, subject to the 1886–87 loan. The coupons of this loan were declared receivable for customs duties. No new loans were allowed to be issued during the funding period, and surplus revenues were to be used to withdraw paper currency and to create a reserve for the retirement of this funding loan. Altogether £7,630,600 bonds were issued, and all not previously retired by sinking fund were paid off at par in the year 1906.

Late in 1892 it was announced that owing to the condition of the public treasury a further readjustment of finances was requested, and a plan was put into effect whereby the interest on the 5 per cent loan of 1886–87 and on a loan known as the 5 per cent Buenos Aires water-supply and drainage-works loan (for £6,324,400, issued in payment for waterworks contracts) was to be reduced to 4 per cent and the interest on the 6 per cent funding loan of 1891 to 5 per cent between July, 1893, and July, 1898.

In accordance with the plan it was agreed that the interest on all other outstanding loans was to be paid 60 per cent in cash for the period from July, 1893, to July, 1898. Full interest on these loans was to be paid beginning with the latter year. Any surplus earned by the Government was to be used, first, to pay to the holders of the 1886–87 bonds the 1 per cent deducted during the five-year period; and, second, to pay to the holders of the 6 per cent funding loan a similar amount representing interest during the same period. The sinking funds on the various loans were not to be operated until January, 1901.

Through efforts on the part of the Government the finances of the Republic were readjusted at a date earlier than was anticipated, and full interest payments were resumed one year before the expiration of the agreement. Interest on the 5 per cent bonds of 1886–87 for the period 1893 to 1898 was paid in full in 1898, and settlement was made with the holders of the 6 per cent funding-loan bonds on the basis of five-sixths of the amount unpaid. Sinking-fund operations were resumed as scheduled in January, 1901.

During the period 1897 to 1900 the Government created various issues of 4 per cent bonds in settlement of national railway guaranties in arrears and for the settlement of the obligations of the Provinces of Buenos Aires, Santa Fe, Entre Rios, Tucuman, Cordoba, Catamarca, San Juan, San Luis, Corrientes, and Mendoza, as well as the city of Buenos Aires and the Santa Fe Railways. Bonds amounting to £31,870,890 were issued for this purpose, of which approximately £27,000,000 remain outstanding. These bonds are mostly held in Great Britain, France, and Belgium. A sinking fund of one-half of 1 per cent per annum, cumulative, is provided for the service of these loans.

STEADY ADVANCEMENT IN CREDIT AND VALUE OF SECURITIES.

Following the readjustment of its finances the credit of the Republic steadily improved, and the value of its securities steadily advanced. In the years 1907 to 1911 several important loans were authorized. Although these were classed by the Government as internal loans, they were practically all sold abroad.

The 5 per cent internal gold loan of 1907 was authorized to the amount of £7,000,000. These bonds were issued in London, Berlin, and Paris.

In 1908 the Government confined its financial operations to the issuance of £892,857 4 per cent gold bonds, which were subsequently turned over to the Argentine North Eastern Railway as a portion of the cost of certain extensions. In 1910 £466,269 additional 4 per cent bonds were issued to this railway in part payment for its extension to connect with the Paraguay Central Railway.

In 1909 the city of Buenos Aires issued £2,976,180 bonds in London and Germany, secured by certain taxes. These bonds were assumed in 1913 by the National Government.

In 1909 the Government issued £10,000,000 5 per cent internal gold bonds—£2,960,000 in London, £3,400,000 in Paris, £1,640,000 in Berlin, and £2,000,000 in New York. A portion of the bonds offered in New York were resold abroad. The proceeds of the loan were used to provide for railways and other public works. The sinking fund is 1 per cent per annum, cumulative. A 5 per cent loan for £1,209,600 was also created in 1909, the proceeds to be used to purchase the Cordoba & North Western Railway for the Government. The offering price was 101.

During the year 1911 a 350,000,000-franc 4½ per cent internal gold loan was floated in Paris and Antwerp at 99½ per cent, the proceeds to be used for certain public works. The sinking fund is 1 per cent per annum, cumulative.

In 1913 an issue of £5,000,000 5 per cent bonds of the port of the capital (Buenos Aires) was authorized. Approximately £1,000,000 of these bonds were sold to provide for port extensions. In the same year £1,367,500 bonds were authorized, to be issued to the various railway companies for the construction of irrigation works.

BONDS ISSUED DURING 1915.

In 1915 the condition of the financial markets of Europe brought about by the war compelled Argentina to seek new channels in which to obtain funds to carry out certain public works that were under way and to meet the necessary financial requirements of the country. The first issue made by the Government was for £5,000,000 and $25,000,000 treasury bonds of 1915. The sterling bonds were offered in London and the dollar bonds in the United States. The proceeds of the issue, which matures May, 1920, were used to retire £9,000,000 treasury bills and to pay for public works. The bonds were declared free from all present and future Argentine taxes, and after May 15, 1917, the sterling and the dollar bonds are interchangeable at the rate of $4.86 per pound sterling. Through this method of exchange a large portion of the bonds sold in Great Britain have been repurchased by American investors.

TOTAL BONDS OUTSTANDING—POSITION OF FOREIGN INVESTORS.

Including the bonds issued during 1915 as above and the internal loans of 1907–1911, but excluding the assumed bonds of the city of Buenos Aires, there were outstanding December 31, 1915, a total of £70,797,702 bonds, the original issues of these having amounted to £86,192,658. Great Britain holds by far the largest amount of these bonds, the remainder being distributed in France, Germany, the Netherlands, Belgium, and the United States. Large additional amounts of bonds were sold in the United States during 1916 and

1917—wholly short-term obligations. The purchase of these by American investors probably gives the United States second rank among the holders of Argentine external bonds, the American holdings now amounting to possibly one-quarter of the total. These bonds have found favor among American investors, and the public offerings have been generally oversubscribed. The holdings of the British, French, and presumably other European investors have largely been loaned to their respective Governments, and a large percentage of them represent collateral for loans made by these nations to carry on the present war.

Argentine bonds in normal pre-war times have enjoyed great favor in Europe. During the period 1911 to 1914 most of the 5 per cent issues sold as high as 104 to 106 per cent, the 4½ per cent bonds as high as 102 per cent, the 4 per cent bonds at 91½ per cent, and the 3½ per cent bonds at 86½ per cent.

The following table shows the quotations of Argentine Government loans on the London Stock Exchange:

Loans.	Amount issued.	Amount outstanding.	High price since 1911.[a]	Price January 1918.
5 per cent of 1884	£1,683,100	£675,500	104	93
5 per cent, 1886–87	8,290,100	4,497,300	106	96
5 per cent, 1887–88–89, Northern Central Railway extension	3,968,200	2,517,700	104½	92
5 per cent, 1890, railway	2,976,000	2,012,020	104	90
5 per cent treasury conversion, 1887	624,000	369,800	104½	88
4½ per cent internal loan, 1888	3,953,700	2,453,080	102	82
4½ per cent sterling conversion, 1888	5,263,560	3,405,460	102	84
3½ per cent external, 1889	2,659,500	1,327,680	86½	81
5 per cent Buenos Aires water supply and drainage works, 1892	6,234,400	4,717,080	105	97
4 per cent railways guaranteed rescission	11,603,100	9,080,100	96½	81
4 per cent of 1897	6,746,031	5,811,692	91½	68
4 per cent of 1898	1,527,778	1,316,088	91½	68
4 per cent of 1899	3,035,736	2,614,616	91½	68
4 per cent of 1890	2,825,515	2,583,855	91½	68
4 per cent of 1890, second series	2,649,663	2,281,062	91	68
Port of Buenos Aires 5 per cent	2,000,000	1,445,000	105	89
5 per cent internal gold loan, 1907	7,000,000	[b] 2,409,760	104½	81
4 per cent bonds of 1908	892,857	780,400	90	68
5 per cent internal bonds of 1909	10,000,000	[b] 2,795,920	104½	84
5 per cent internal bonds of 1910	1,209,600	1,134,100	105	86
5 per cent port of the capital bonds	5,000,500	996,200	103	84
5 per cent irrigation bonds	1,367,500	1,153,100	103½	84
4 per cent loan of 1910	466,270	303,600	90	67

[a] The par value of each of these bonds is £100 (see general text). Coupons on all of these issues are payable semiannually, the dates varying.

[b] Outstanding balance of portion of issue quoted in London.

INTERNAL DEBT OF REPUBLIC.

Not including the bonds that are classed by Argentina as internal debt but are held externally, there are outstanding approximately $2,500,000 bonds payable in gold and approximately $170,000,000 payable in currency. The principal issue is that known as the 5 per cent internal credit of 1905, bonds of which are outstanding to the amount of approximately $86,000,000 m/n. These bonds sell on the Bolsa (stock exchange) at Buenos Aires at approximately 88 per cent. The 5 per cent internal credit bonds of 1911 are outstanding to the amount of approximately $47,000,000 m/n. The health works loan of 1902 is next in importance, bonds outstanding totaling about $10,000,000 m/n. The two gold loans consist of approximately $2,100,000 o/s 4½ per cent loan of the guaranteed banks and

$500,000 o/s 5 per cent loan of 1891. These various loans are listed on the Bolsa at Buenos Aires and enjoy favor among the investors of Argentina. Few of them have found their way out of the country.

CEDULAS OF NATIONAL MORTGAGE BANK.

These "cedulas" are certificates to bearer issued by the National Mortgage Bank in lieu of cash to borrowers on various forms of real estate. A market has been created for these cedulas, so that the borrower may readily dispose of them for cash. The principal of these cedulas is paid off by means of an annual sinking fund, usually of 1 per cent per annum (series I is 4 per cent). Throughout the various other Republics of South America a similar system of loaning on real estate is in vogue. Many of the Argentine cedulas are held abroad. The first issue was made in the year 1886, when three currency issues to the total amounts of £1,746,053, £1,309,539, and £1,309,539, respectively, were brought out. The first of these issues was finally extinguished in 1906 and the second and third in 1910. These issues bore interest at the rate of 7 per cent per annum. Two series of £1,746,053 each were issued in 1888, and were finally extinguished through sinking funds in 1912. Gold series A was also issued in 1888, bonds to a total of £3,968,254 being brought out. The sinking fund was the usual 1 per cent per annum. Three other series of cedulas, F, G, and I, the former two dated 1896 and the last-named dated 1905, were extinguished in 1911 and 1912. These issues were for £1,309,539, £873,027, and £221,740. The cedulas of the National Mortgage Bank outstanding September 1, 1917, were as follows:

Series.	Interest rate.	Amortization.	Original issue.	Paid off.	Owned by National Mortgage Bank.	Amount in circulation.
	Per cent.	*Per cent.*	*$m/n.*	*$m/n.*	*$m/n.*	*$m/n.*
A	7	1	20,000,000	20,000,000	....	....
B	7	1	15,000,000	14,337,900	662,100	....
C	7	1	15,000,000	14,575,450	424,550	....
D	7	1	20,000,000	17,303,250	2,696,750	....
E	7	1	20,000,000	17,424,930	2,575,070	....
F	7	1	15,000,000	13,135,300	1,864,700	....
G	7	1	10,000,000	8,664,800	1,335,200	....
H	7	1	61,621,300	47,987,100	4,234,500	9,399,700
I	6	4	2,339,900	2,148,000	391,900	....
J	6	1	9,264,100	6,117,800	892,900	2,253,400
K	5	1	70,165,000	40,373,150	4,422,950	25,368,900
L	6	1	89,966,000	35,999,650	5,363,500	48,602,850
Cedulas hipotecaria Argentina	6	1	446,441,900	58,460,700	26,112,300	361,868,900
Second Law 9155:						
First series	6	1	49,926,300	1,962,475	2,348,000	45,615,825
Second series	6	1	36,390,400	72,600	324,800	35,993,000
Total, currency series	....	....	881,314,900	298,563,105	53,649,220	529,102,575
			$o/s.	*$o/s.*	*$o/s.*	*$o/s.*
A, gold	5	1	20,000,000	11,453,289	324,261	8,222,450

The approximate quotations on the Buenos Aires Stock Exchange for the above series as of September, 1917, were as follows: Series H, 105; series J, 97.50; series K, 88.50; series L, 99; cedulas hipotecaria Argentina, 96; new series, 1914, 93.50.

The gold series (A) is converted into sterling at $5.04 to the pound, and the currency series at the same rate, with premium on gold at the rate of 127.27 per cent, officially fixed by the conversion law of 1899. These cedulas are a form of investment very much in favor in Argentina. Large numbers of them are also held abroad, in Spain, Italy, Great Britain, Belgium, the Netherlands, etc. They are listed and comparatively active on the Bolsa at Buenos Aires and enjoy markets in Europe under normal conditions. It is estimated that the interest paid abroad on these cedulas during the financial year 1916 totaled approximately £1,965,000, or nearly three-fourths of the total interest paid on all outstanding issues. During the past two years, it is stated, a small amount of North American capital has sought this form of investment in the Argentine Republic, and it is not unlikely that future issues will find their way to the United States in increasing amounts.

TOTAL EXTERNAL DEBT.

The total outstanding debt of an external character, according to the Report of the Corporation of Foreign Bondholders, is as follows:

Character of securities.	Original amount.	Amount outstanding.
Ordinary issues	£86,192,658	£70,797,702
Special issues	34,744,390	30,219,122
National cedulas	77,732,389	47,378,356
Total	198,669,437	148,395,180

PROVINCIAL LOANS.

PROVINCE OF BUENOS AIRES.

The external loans of the Province of Buenos Aires, the original issues, and the approximate amounts outstanding are as follows:

Loans.	Original amount.	Amount outstanding.
3½ per cent Sterling Loan of 1907	£11,160,980	£10,060,980
5 per cent Sterling Loan of 1908	1,500,000	1,417,020
4½ per cent Railway Loan of 1909 and 1912	3,375,015	3,304,055
4½ per cent Loan of 1910	2,000,000	1,935,440
4½ per cent External Loan of 1910	3,500,000	3,381,032
4½ per cent Mar del Plata Loan of 1911	611,111	611,111
5 per cent La Plata Paving Loan of 1913	440,878	440,878
5 per cent Consolidated Gold Loan of 1915	....	541,905
5 per cent External Gold Loan of 1910	1,047,620	999,960

All loans issued by the Province of Buenos Aires prior to 1898 were in that year converted into 4 per cent bonds of the Argentine Government and appear under the special external debt of the Republic. The bonds are guaranteed by the Republic, but the Province of Buenos Aires is responsible to the nation and under obligation to refund the service to the Government. No attempt will be made in this report to review the early financial history of the Province.

The 3½ per cent loan of 1907 was issued by the provincial government in exchange for cedulas of the Provincial Mortgage Bank.

The interest rate for the first five years was 3 per cent per annum. An extraordinary sinking fund to be derived from sums due the Mortgage Bank was to be used to retire bonds and after 10 years an annual cumulative sinking fund of one-half per cent was to go into effect. The financial crisis brought about at the beginning of the European war compelled the Province to arrange a scheme with the bondholders whereby the latter would accept in payment for each 35s. semiannual coupon in 1915 10s. in cash and 25s. in 5 per cent funding certificates to be redeemable at par in 10 annual drawings commencing October, 1916. The coupons were to remain valid during the life of the funding certificates, and, in case of default in any of the conditions of the arrangement, the certificates were to be immediately receivable in payment of the territorial contribution and the produce tax of the Province, on which taxes the 3½ per cent bonds are a lien. The 1916 coupons, according to the arrangement, were to receive 15s. in cash and 20s. in funding certificates.

The highest price recorded since January, 1911, for these bonds was 74½ per cent, and the lowest since the outbreak of the war was 33 per cent. In April, 1917, the price was 44 per cent.

In March, 1915, the government of the Province announced that, in view of conditions then existing, it would be impossible to meet the interest and sinking fund on the 4½ per cent loans of 1909, 1910 (French loan), and 1911 and on the 5 per cent loans of 1908, 1910, and 1913. The announcement further stated that the amortization of the loan would be suspended for two years and that the interest would be paid at the rate of 115 per cent into 5 per cent consolidated gold bonds, secured by a first charge on the taxes on alcohol and on commerce and industry, less a small portion already pledged for loans. The new bonds are redeemable by an annual sinking fund of 2 per cent commencing January, 1918. At the date of the announcement it was stated that the government would continue the service on the 4½ per cent loan of 1910, issued in Berlin, Germany. This loan is secured on the $25,000,000 shares of the Bank of the Province of Buenos Aires (held by the government) and by certain taxes.

The 5 per cent loan of 1908 was originally issued at 88 per cent, one-half in London and Berlin and one-half in Paris, to meet expenditures on drainage and canal works, etc. Its 1 per cent sinking fund commenced in 1910.

The 4½ per cent railway loan of 1909 and 1912 was issued, one-third in London at 88½ per cent and the remaining two-thirds in Paris, for the purpose of providing funds for the construction of two railways, one of which is assigned as security for the loan. The sinking fund of 1 per cent per annum commenced operations in November, 1913. The 1912 issue of the loan was made in Paris, making a total of 67,000,000 francs of this issue held in France. The 5 per cent external loan of 1910 was issued in London to provide funds for certain public improvements. The remainder of the loans were marketed in Paris. They are secured by various taxes assigned for their service.

The high, low, and recent prices for certain of these provincial loans since January 1, 1911, have been as follows:

Loans.	High.	Low.	Price January, 1918.
3½ per cent loan of 1907	74½	33	49
5 per cent loan of 1908	102	45	64
4½ per cent external railway loan	96½	38	56
5 per cent external loan of 1910	101½	45	63
5 per cent consolidated loan of 1915 [a]	....	....	68

[a] Issued to fund.

The internal debt of the Province is subdivided into several bond issues, practically all of which are listed on the Bolsa at Buenos Aires. The approximate total of this debt is as follows:

Loans.	Total outstanding.	Sinking fund.	Price September, 1917.
	$ m/n	*Per cent.*	
5 per cent School, etc., loan (1900)	2,205,800	1	75.00
6 per cent Conversion loan	7,504,450	1	88.00
6 per cent "Mont-de-Piété" loan	35,325,250	1	82.00
6 per cent School loan	5,749,100	1	76.00
6 per cent Health Works loan	8,837,000	1	81.00
5 per cent Bank of the Province loan	12,596,920	½	71.00
5 per cent Road Paving loan	7,924,000	1	....
5 per cent Paving loan	1,125,200	1	....
2½ per cent Savings Bank loans	8,246,400	½	31.70
Total	89,515,120		

PROVINCE OF CORDOBA.

This Province has outstanding an external loan, listed in London, which carries interest at the rate of 2¾ per cent per annum until 1924, when the rate will be raised to 3¼ per cent; the rates will then be advanced over a period of years to 3½ and 4 per cent. The bonds sell at approximately 40 per cent, and the amount outstanding is £703,800. The bonds are dated 1887–89.

PROVINCE OF CORRIENTES.

This Province, in the year 1910, issued £396,825 of 6 per cent external gold bonds in Great Britain and on the Continent. The British investors subscribed to approximately two-thirds of the total at 98 per cent. The loan is secured on railway mileage and on certain taxes. In August, 1915, the Province was unable to meet its coupons owing to existing conditions. Other coupons have since been unpaid. The bonds sell at about 70 per cent.

OTHER PROVINCIAL LOANS (INTERNAL).

Several of the other Provinces of the Republic have, from time to time, been borrowers in the local markets of Argentina. Space will not permit a full study of the finances of these Provinces. A few of these loans are:

Loans.	Dated.	Interest.	Sinking fund.	Price September, 1917.
		Per cent.	*Per cent.*	
Consolidated debt, Province of Santa Fe	1886	6	1	81.00
Consolidated debt, Province of Santa Fe	1893	6	1	81.10
School bonds, Province of Santa Fe	1903	7	5	[a] 94.00
Public building bonds, Province of Santa Fe	1903	7	5	[a] 92.50
Consolidated debt, Province of Entre Rios	1903	6	1	60.00
School bonds, Province of Entre Rios	1909	6	2	61.00
Public funds, Province of Entre Rios	1905	5	1	50.00
Pavement bonds, Province of Mendoza	1909	8	20	[b] 89.50
Internal public debt, Province of Mendoza	1914	8	....	76.00
Internal public debt, Province of Santiago del Estero	1914	8	....	71.00
Loan of the Province of Tucuman	1906	6	4	[b] 89.00

[a] Dec. 31, 1913.

[b] December, 1912.

In addition to these internal loans and others of like character, the Provinces of Santa Fe, Tucuman, Mendoza, and San Juan have external loans outstanding. These are small loans, and, with the exception of 6 per cent bonds of the Province of San Juan, the interest rate is 5 per cent. All the loans are provided with sinking funds of from one-half to 1 per cent. No recent quotations are available.

A number of the Provinces are responsible for the service of the 4 per cent provincial and municipal debt bonds of the Republic. A brief description of these financial operations has been given in the section on national loans. In some instances security has been assigned for the payment undertakings.

MUNICIPAL LOANS.

The principal municipalities of Argentina that have sought loans abroad are Buenos Aires, Rosario, and Santa Fe, all of which have been borrowers in the European markets. Buenos Aires has, naturally, been the largest borrower and has secured—largely in Great Britain—considerable sums for municipal improvements. The most important of the Buenos Aires loans are the following:

Loans.	Original amount.	Amount outstanding.	Original price.	Price January, 1918.
			Per cent.	*Per cent.*
4½ per cent bonds of 1889	£1,984,120	£537,320	86½	78
5 per cent loan of 1909	[a] 2,976,180	[a] 1,453,660	98½	84
5 per cent loan of 1913-14	4,960,300	4,920,140	96	78

[a] The Government of Argentina has assumed this loan, which is secured by the proceeds from certain taxes.

In addition to assuming the responsibility for the 5 per cent loan of 1909, the Government considers the outstanding balance of the $20,000,000 currency loan of 1891 among its internal obligations. The September, 1917, price for these bonds was 91.50. The Government is also responsible for the 6 per cent loan of 1897 (internal), quoted at $91 m/n in September, 1917. Other internal loans of the city are as follows:

Loans.	Rate.	Sinking fund.	Price, September, 1917.
	Per cent.	*Per cent.*	
Loan of 1882	6	1	95
Theater Colon loan	6	1	85
Pavement loan, 1904	5	1	80
Pavement loan, 1910	5	7	73
Municipal certificates	7	....	92

The municipality of Rosario has outstanding £1,982,775 bonds of an issue of £2,000,000 4 per cent gold external bonds, guaranteed principal and interest by the Province of Santa Fe. The bonds were originally issued in 1887 and in 1889, and were placed on a full interest basis in 1913. The direct tax of the Province of Santa Fe has been assigned as security. A recent price is 46 per cent. Two internal loans are also obligations of the municipality. One bears interest at 7 per cent and has a sinking fund of 1 per cent, and the other bears interest at 6 per cent and carries a 2 per cent sinking fund. The latter bonds were quoted at 71.50 in May, 1915.

In 1889 the city of Santa Fe issued bonds to the amount of £257,900 at 6 per cent. These bonds defaulted in 1891 but part of the arrears were made up through the issuance of £42,100 sterling funded coupon bonds. From 1905 to 1915 interest was paid at the rate of 4 per cent per annum in Argentine currency, and from September, 1915, at the rate of 6 per cent per annum, also in currency. The latest £3 semiannual coupon realized £1 6s. The bonds and the sterling coupon bonds were quoted, in January, 1918, at about 26 per cent of par (£100). The original offering price was 95 per cent.

BANKS AND BANKING.

Considerations of space will make it impracticable to give a fully detailed account of banks and banking methods in Argentina. Brief mention will be made, however, of a number of the important local and foreign institutions in the banking field, and the subject of banking in the Republic will be discussed in a general way.

The history of the banks in Argentina virtually began with the establishment of the Compañía del Banco de Buenos Aires, on September 6, 1822. The original capital consisted of 225 shares of the par value of 1,000 pesos, this amount being increased to 466 shares in the following year. A dividend of 18 per cent resulted from the first year's operations. In 1826 the bank was incorporated into the Banco de las Provincias Unidas del Rio de la Plata. In 1836 this somewhat unwieldy title was changed to Casa de Moneda, and later to Banco de la Provincia de Buenos Aires.

Between 1862 and 1872 several banks began operations, among them the London & River Plate Bank. At the close of the nineteenth century there were 42 banks of all classes in Argentina; by January 1, 1906, this total had increased to 67, and to-day the number is about 150. Employees of banks number more that 12,000.

BANK OF THE ARGENTINE NATION.

The Bank of the Argentine Nation (Banco de la Nación Argentina), with head offices at Buenos Aires and branches throughout the Republic, is the official Government financial institution. It dates from the year 1891, when it began business with a capital of $50,000,000 m/n. In 1905 the capitalization amounted to $100,000,000 m/n. At the present writing the capitalization stands at $128,000,000 m/n. Cash reserves amount to $39,672,331 o/s and $356,349,582 m/n, and deposits amount to $7,621,624 o/s and $785,403,037 m/n. The bank is allowed to make loans to no Government except that of Argentina, and may loan to the National Government only to the extent of 20 per cent of its capital. The bank must hold on deposit a conversion fund, in gold, to which the Government contributes out of the revenues. This gold reserve is held against the paper currency which was issued previous to the passing of the conversion law and which remains in circulation. One-half of the profits of the bank is to be applied to the increase of capital and one-half is to be converted into gold to be credited to the reserve. The following table illustrates the growth of the institution:

Years.	Deposits.		Discounts and advances.		Cash reserves.	
	$ o/s.	*$ m/n.*	*$ o/s.*	*$ m/n.*	*$ o/s.*	*$ m/n.*
1902	1,674,217	92,666,380	6,618	77,647,435	8,244,892	42,790,796
1907	4,939.514	123,773,866	2,050,656	214.022,278	18,618.100	55,075.452
1912	5,290,593	420,622,407	1,884,630	415,429,677	37,802.050	130,660,991
1913	10,489,372	517,543,791	1,883,733	541,383,242	32,272,702	180,056,991
1914	9,723,293	583,313,147	924,366	605,411,541	28,641,226	194,147,851
1915	4,212,518	663,229,627	454,644	422,361,077	10,759,652	379,135,455
1917	7,621,624	785,403,037	243,272	476,528,216	39,672,831	356,349,582

CONDITION AND GENERAL CHARACTER OF ARGENTINE BANKS.

The table on the next page shows the condition of the various banks doing business in the city of Buenos Aires on June 30, 1917:

Banks.	Deposits in current accounts and savings banks.		Discounts and advances.		Cash reserves.		Capital subscribed or corresponding to Argentine Republic.	
	$ o/s	$ m/n	$ o/s	$ m/n	$ o/s	$ m/n	$ o/s	$ m/n
German Transatlantic	1,181,177	38,130,091	1,001,291	24,794,916	1,731,913	12,393,308	3,650,000	....
Anglo-South American	289,928	31,246,607	799,018	34,658,134	236,687	9,010,084	2,475,000	5,713,636
British of South America	712,056	53,418,910	723,057	28,389,769	3,091,735	14,732,627	4,536,000	....
Italian Commercial	470,971	19,817,428	87,537	18,541,186	153,151	6,211,533	....	5,000,000
Spain and America	....	865,855	....	1,199,291	....	417,621	....	1,282,440
Spanish of the River Plate	826,968	183,021,949	544,034	206,104,313	2,101,668	57,000,796	....	98,146,200
French and Italian	182,130	26,783,915	162,137	19,227,733	330,610	5,981,788	2,500,000	....
Galicia and Buenos Aires	46,756	20,141,038	283	27,704,129	52,716	4,851,887	....	16,968,120
German of South America	497,035	16,820,346	119,975	16,469,686	322,851	5,185,206	1,720,000	....
Dutch of South America	8,360	27,625,340	53,259	30,019,932	734,081	9,384,409	3,805,833	....
Italy and River Plate	930,625	87,625,925	1,181,014	103,584,208	1,189,256	21,055,771	10,000,000	....
Italian-Belgian	41,124	25,669,899	....	11,979,318	46,853	9,644,316	1,000,000	....
London and Brazil	304,678	20,446,963	600,739	9,951,316	760,547	3,596,837	1,268,190	1,950,000
London and River Plate	2,540,084	146,516,823	632,363	67,033,234	5,505,711	58,828,536	4,230,000	....
Bank of the Argentine Nation [a]	6,834,502	814,980,927	178,193	485,092,960	39,045,984	351,521,252	....	128,000,000
New Italian	173,507	50,578,951	54,749	44,739,740	275,147	13,957,081	....	5,000,000
Argentine Popular	665,170	22,156,427	519,527	33,728,423	747,939	3,738,331	....	10,514,565
Province of Buenos Aires [b]	1,602,099	197,409,998	315,773	176,755,875	3,338,311	64,718,368	....	62,412,140
National City Bank of New York	777	33,817,672	....	25,434,815	1,051,125	8,782,687	....	2,355,454
Four banks with less than $1,000,000 m/n capital	....	645,232	....	1,884,787	....	343,238	137,000	1,924,045
Total	17,313,607	1,817,720,296	6,972,909	1,367,293,765	60,716,285	661,355,679	35,441,023	339,266,600
Total in May	17,518,861	1,766,968,694	7,473,854	1,349,527,413	61,126,544	646,053,466	35,441,023	343,056,054

[a] Including judicial deposits $96,074 o/s and $67,873,214 m/n and Cámara Compensadora (Clearing House) $5,052,683 o/s and $89,875,455 m/n.

[b] Including judicial deposits $1,745 o/s and $19,410,427 m/n.

The following table shows the condition of the Buenos Aires banks, taken together, at the end of each of the first six months of 1917 and at the end of June, 1916:

Dates.	Deposits.		Discounts and overdrafts.		Cash balances.	
	$o/s	$m/n	$o/s	$m/n	$o/s	$m/n
January 31, 1917	15,422,449	1,646,104,070	9,116,503	1,298,291,275	45,748,181	612,443,566
February 28, 1917	15,281,050	1,687,745,464	9,609,452	1,348,115,864	53,533,475	640,055,371
March 31, 1917	16,998,576	1,733,495,947	8,519,445	1,344,081,602	59,444,981	654,909,283
April 30, 1917	19,422,635	1,735,769,186	7,916,534	1,350,447,209	63,096,179	637,190,746
May 31, 1917	17,518,861	1,766,968,694	7,473,854	1,349,527,413	61,126,544	646,053,466
June 30, 1917	17,313,607	1,817,720,296	6,972,909	1,367,293,765	60,716,285	661,355,679
June 30, 1916	14,646,695	1,528,645,300	8,698,370	1,219,014,825	28,268,521	652,271,912

The issuance, exchange, and conversion of the paper currency of the Argentine Republic is dealt with by the Government Office for the Conversion of Currency (Caja de Conversión), which is under the control of the Minister of Finance. This institution holds the supply of gold reserved as guarantee for the convertible value of the paper currency that it issues. Statements are regularly issued by the institution showing the total circulation of paper currency, the stock of gold in the Caja de Conversión and the amounts of gold deposited in foreign countries. As of June 30, 1917, it was stated that $261,592,511 gold was held in the Caja de Conversión and $55,254,373 abroad.

Quotations and dividend records of several important local banks will be found in the Appendix (p. 497) among the lists of securities quoted on the Bolsa at Buenos Aires.

Among the most important banks of the Republic is the Spanish Bank of the River Plate (Banco Español del Rio de la Plata), in which $98,065,340 m/n has been invested. The par value of the shares is $100 m/n, and a recent selling price was 115 per cent. The subscribed capital now amounts to $100,000,000 m/n (£8,730,158). The bank was established in 1882, the head office being located at Buenos Aires. There are 48 branches in the principal cities of Argentina, as well as 3 in Brazil (Rio de Janeiro, Santos, São Paulo), 1 in Montevideo, Uruguay, and 10 in Europe.

The Argentine Popular Bank (Banco Popular) is another important local institution. The bank was established in 1887 and, as shown by the above table of deposits, etc., has become a power in the Argentine Republic. Previous to the war the bank paid dividends of from 12 to 14 per cent. For the fiscal year ended June 30, 1916, the rate was 9 per cent. The $20 m/n shares were quoted in September, 1917, at $26 m/n.

The Bank of the Province of Buenos Aires (Banco de la Provincia de Buenos Aires), which, as already stated, is the oldest bank in the Republic, has its head office at La Plata and branches in Buenos Aires and elsewhere. The $100 m/n shares were quoted in September, 1917, at $125 m/n, a rise of 17 points from the low price of the year. The dividend for the year 1916 was at the rate of 6½ per cent, as compared with 10 per cent per annum paid during the three years prior to the war.

The New Italian Bank (Nuevo Banco Italiano) is one of the most profitable banks in the Republic. It was founded in the year 1887, and its dividend record has been a most substantial one. In 1911, 20 per cent was paid; in 1912, 22 per cent; in 1913, 23 per cent; and in 1914, 18 per cent. The rate for the fiscal year 1915–16 was 12 per cent. The shares, which have a par value of $100 m/n, have sold between 205 and 215 per cent during 1917.

The Italian Commercial Bank (Banco Comercial Italiano), incorporated in 1898, has for years paid moderate dividends. Its $100 m/n shares sold in September, 1917, at approximately par. The head office of the institution is in Buenos Aires.

The important provincial banks of the Republic are:

Banks.	Date founded.	Capitalization.
		$m/n
Bank of the Province of Santa Fe	1874	2,426,734
Bank of the Province of Salta	1884	....
Bank of the Province of Mendoza	1888	33,254,481
Bank of the Province of San Juan	1888	3,122,121
Bank of the Province of Tucuman	1888	4,488,481
Bank of the Province of Catamarca	1889	287,490
Bank of Cordoba	1902	6,429,931

ITALIAN COMMERCIAL BANK.

The Italian Commercial Bank has been a most progressive institution, as will be indicated by the following table:

Years.	Capital paid in.	Deposits.	Reserves.	Dividends.
	$m/n	*$m/n*	*$m/n*	*Per cent.*
1899	151,365	171,934	....	....
1904	500,925	1,119,210	....	....
1909	1,045,582	4,067,839	130,073	....
1910	3,005,380	6,908,885	235,179	6½
1911	3,782,370	7,944,419	305,722	8
1912	4,407,690	10,633,792	501,729	9
1913	4,783,350	11,335,995	654,547	9
1914	4,995,860	10,714,219	748,729	7
1915	4,998,120	14,849,066	789,919	6½
1917 [a]	5,000,000	[b] 18,070,675	[c] 700,000	[c] 4

[a] April 30, 1917.

[b] Also $515,614 gold.

[c] Year 1916.

Discounts and advances as of June 30, 1917, amounted to $87,537 o/s and $18,541,186 m/n.

ARGENTINE POPULAR BANK.

As a typical illustration of the development of banks in the city of Buenos Aires, reference may be made to the Argentine Popular Bank. This institution, founded in 1887, has increased its capital since the year of its incorporation from $980,500 m/n to $1,014,511 m/n. There are 3,505 holders of the bank's shares—2,626 being of Argentinian nationality, 302 Italian, 226 Spanish, 390 British, 117 French, 75 Uruguayan, 44 German, 4 American, 3 Serbian, etc. Of the holders, 602 are merchants, 222 engaged in agricultural pursuits, 144 lawyers, 103 doctors, 62 engineers, 57 journalists, 531 engaged in domestic occupations, etc. In addition to its shares, the bank has outstanding approximately $930,000 o/s 5 per cent bonds and $1,472,-

500 m/n debentures. The following table illustrates the increases in deposits and capitalization:

Years.	Deposits.	Capital.	Annual profits.
	$m/n	$m/n	$m/n
1888	838,387	980,500	34,208
1893	2,305,225	1,121,980	(c)
1898	3,069,448	1,754,140	217,528
1903	5,934,585	2,823,100	(c)
1908	8,243,840	4,603,380	687,830
1912	17,266,225	9,732,720	(c)
1913	21,832,875	10,073,300	1,594,573
1914	22,348,844	10,509,860	1,531,081
1915	20,966,880	10,519,520	1,080,972
1916	21,434,938	10,515,180	1,098,672
1917 a	b22,258,989	10,514,511	(c)

a May 7, 1917. b Also $655,589 gold. c Not obtainable.

The annual dividends paid during recent years on the shares of the Popular Bank have varied from 9 to 13 per cent. In 1915 and 1916 the annual rate was 9 per cent. As will be seen from the above table, the bank, since the outbreak of the European war, has shown decreased profits and paid smaller dividends—a condition that has prevailed generally among the banks of Argentina.

SPANISH BANK OF THE RIVER PLATE.

As an indication of the general decrease in profits that followed the breaking up of the pre-war boom in Argentina, the earnings and profits of the Spanish Bank of the River Plate—one of the strongest and best-managed institutions of its kind in the country—are shown (fiscal year ended June 30):

Items.	1914	1915	1916
	$m/n	$m/n	$m/n
Net earnings	12,563,099	4,412,718	5,497,241
Expenses	7,131,288	2,176,340	2,725,481
Profits	5,431,811	2,236,378	2,771,760
Dividends, etc.	5,362,654	2,177,982	2,726,201
Credit to P. & L.	69,157	58,396	45,049

During the year preceding the preparation of this report there has been a steady advance toward normal prosperity, as shown by the fact that the bank's shares were selling in September, 1917, at 115, an advance of 11 points as compared with the low price for the year. In 1914, before the war, the high price was 125. Between June 30, 1916, and April 30, 1917, deposits increased as follows: June 30, 1916, $149,256,145 m/n; April 30, 1917, $832,474 o/s and $174,960,192 m/n.

GERMAN TRANSATLANTIC BANK.

It is interesting to note the deposits in the German Transatlantic Bank (Banco Alemán Transatlántico), which is much the largest and most important German bank in the field, for the years preceding and following the outbreak of the war. The table refers to deposits in Argentina only:

Years.	Deposits.	Discounts.	Reserves.
	$m/n	$m/n	$m/n
1906	30,795,000	41,602,000	9,869,000
1910	57,889,000	58,690,000	15,130,000
1911	60,057,000	65,400,000	16,960,000
1912	61,890,000	66,880,000	17,975,000
1913	57,760,000	60,735,000	19,200,000
1914	36,191,000	35,698,000	15,341,000
1915	38,866,000	33,700,000	13,380,000
1917[a]	[b] 37,000,000	[b] 27,000,000	[b] 14,500,000

[a] April 30, 1917. [b] Estimated; approximately correct.

The capital employed by the German Transatlantic Bank in Argentina as of April 30, 1917, amounted to $3,650,000 o/s, equal to approximately $8,000,000 m/n.

BRITISH BANKS IN ARGENTINA.

The British banks in Argentina are:

Banks.	Capitalization.	Reserves.	Dividends.	Approximate capital in Argentina.	Par value of shares.		High price since 1911.	Price January, 1918.
			Per ct.					
London & River Plate Bank	£1,800,000	£2,000,000	15	£900,000	[a] £25	[b] £15	64	37
London & Brazil Bank	1,250,000	1,400,000	20	450,000	[a] 20	[b] 10	37	24
Anglo-South American Bank	2,250,000	1,500,000	10	1,000,000	[a] 10	[b] 5	10¾	7½
British Bank of South America	1,000,000	1,000,000	22	900,000	[a] 20	[b] 10	32¼	19

[a] Total amount that may be called. [b] Amount paid in.

The British banks have been powerful factors in trade development between Great Britain and Argentina. Furthermore, as the dividend record shows, they have been highly profitable. During the great boom that reached its climax in 1913 three banks paid even larger dividends than at present. The London & River Plate Bank paid 20 per cent in each of the years from 1910 to 1913; the London & Brazil Bank paid 22 per cent in 1910; the Anglo-South American Bank paid 12 per cent in the years 1910, 1911, and 1912; the British Bank of South America is maintaining its maximum dividend rate, which, as indicated, is very substantial.

Both the London & River Plate Bank and the London & Brazil Bank date from the year 1862; the British Bank of South America was founded in 1863 and the Anglo-South American Bank in 1888. The last-named institution holds an interest in the Bank of the Province of Buenos Aires, in the Commercial Bank of Spanish America, in the Bank of Peru & London, and in other banks. Although its largest business is in Chile, where 11 branches are maintained, the Argentine Republic claims a very substantial portion, there being 7 branches in that country (the most important, of course, being at Buenos Aires). There is also a branch in Montevideo, Uruguay. Nearly three-quarters of the London & River Plate Bank's South American business is handled in Argentina, where 14 branches are maintained. The bank's business during recent years has been most excellent, although there was a slight reduction in profits in the early days of the war.

The London & Brazil Bank is an institution that does its principal business in Brazil. Nevertheless, the two branches in Argentina handle a very substantial gross business and return a considerable profit. The bank maintains 14 branches, including 11 in Brazil and 1 in Montevideo, Uruguay. The British Bank of South America maintains two branches in Argentina, one in Uruguay, and three in Brazil; more than one-half of the business is handled by the two Argentina branches.

OTHER FOREIGN BANKS.

Among other nations represented in the banking field are Italy, France, the Netherlands, and the United States. The National City Bank, of New York, the American pioneer in the field, has steadily developed its Buenos Aires branch, as will be indicated by the fact that on April 30, 1917, the bank stood eighth in the total amount of deposits among the 26 large banks in Buenos Aires. Other American banks that have entered the field are the First National Bank of Boston and the Guaranty Trust Co. of New York. Many other American institutions have established close relations with existing banks in Argentina.

INTEREST RATES PAID.

The interest rates paid to depositors in Argentina are somewhat lower than in most Latin-American countries. The Bank of the Nation allows no interest on current accounts, 2 per cent on 90-day deposits, 3 per cent on 180-day deposits, 4 per cent on savings-bank deposits of at least 60 days' duration for amounts up to $5,000, and 3 per cent for amounts between $5,001 and $10,000. The London and Brazil Bank, Buenos Aires branch, allows 1 per cent on current accounts up to $200,000 m/n, 3½ per cent on three-months fixed deposits, 4 per cent on six-months fixed deposits and on savings-bank deposits, $10 to $10,000 m/n. This bank charges 9 per cent on overdrafts in accounts current, as compared with 8 per cent charged by the Bank of the Nation. The London & River Plate Bank and the British Bank of South America do not allow interest on current deposits. On fixed deposits at three months both institutions allow 3 per cent, and on fixed deposits at six months 3½ per cent is allowed. The savings-bank rate is 3 per cent.[1]

INSURANCE COMPANIES.

Argentina as an insurance field has attracted attention from all parts of the world. No fewer than 26 British companies are represented in Argentina, as well as 3 German, 3 American, 2 French, and 1 each from Switzerland and Brazil. In addition to a number of cooperative societies, there are 58 or more local companies handling various lines of insurance. Space will not permit a full description of these companies, and mention will be made of only a few concerns. The following table will indicate the dividends paid in 1916 and the value of the shares of these companies:

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[1] Persons desiring additional information with regard to banking in Argentina may be referred to two monographs previously issued by the Bureau of Foreign and Domestic Commerce. These are Special Agents Series No. 90, "Banking and Credit in Argentina, Brazil, Chile, and Peru," by Edward N. Hurley, and Special Agents Series No. 106, "Banking Opportunities in South America," by William H. Lough. These publications may be obtained for 10 and 20 cents, respectively, from the Superintendent of Documents, Government Printing Office, Washington, D. C., or from the district or cooperative offices of the Bureau of Foreign and Domestic Commerce.

See also the Appendix of the present monograph, page 538.

Companies.	Approximate capitalization.	Par value of shares.	Price of shares.	Dividend, 1915.
	$m/n	*$m/n*	*$m/n*	*Per cent.*
La Franco-Argentina	1,500,000	50	117	[a] 16
La Hispano-Argentina	700,000	100	....	[a] 20
La Inmobiliaria	2,000,000	100	275	10
La Positiva	1,000,000	5,000	12,000	10
La Estrella	2,000,000	100	....	8
La Economia Comercial	259,075	100	....	15

[a] Rate for 1916; a similar rate was paid in 1915 and a similar or larger rate in previous years

Among the various other companies one may mention La America (average dividend 8 to 11 per cent), España & Rio de la Plata (average dividend 10 per cent), La Equiteva del Plata (average dividend 10 per cent), La Mundial (dividend 25 per cent), La Rosario (dividend usually 10 per cent), La Unión Mercantil (dividend 10 to 12 per cent), La Sud America (dividend 10 per cent), and Unión Comerciantes (fire and hail, dividend 22 per cent). These companies are capitalized at from $300,000 m/n to $2,000,000 m/n and are representative companies.

Premium income for the year 1914 for the various companies amounted to $34,616,192 m/n, of which $22,828,435 m/n was earned by the local companies and $11,787,757 m/n by the foreign companies. The sums insured in 1914 amounted to $1,434,323,116 m/n for the local companies and $1,620,414,125 m/n for the foreign companies. Of this total, $1,183,395,030 m/n and $1,452,827,862 m/n represented fire insurance, and $72,727,147 m/n and $143,310,777 m/n marine insurance.

Foreign insurance companies pay a higher rate of taxation on premiums, as well as a greater sum for trading licenses, than the local companies. The former are also compelled to deposit the sum of $300,000 m/n with the Caja de Conversión or Banco de la Nación as security for the fulfilment of their obligations. Additional sums must also be deposited in the event that more than one branch of insurance is to be handled. The $300,000 m/n may be in the form of bonds of the Government of Argentina. Foreign companies pay a tax of 2 per cent on life insurance and workmen's compensations, as compared with one-half per cent paid by the local companies. On fire, marine, and accident insurance the rate is 7 per cent for foreign companies and 1.4 per cent for local companies. There is no tax on agricultural insurance. The taxes paid by the insurance companies produce an annual revenue to the Government slightly in excess of $1,000,000 m/n. In addition to taxes, as above, there are license fees varying from $2,000 m/n to $10,000 m/n.

All the foreign companies have their main offices in Buenos Aires. Of the local companies 41 have their domicile in that city and the remainder in Rosario, Cordoba, Mendoza, Tucuman, and elsewhere.

RAILWAY DEVELOPMENT.

Argentina is provided with a system of railways, splendidly constructed and well supplied with excellent equipment, that spreads its way throughout all settled sections of the Republic. Around this network of lines is built the economic structure of the entire Republic. The growth and development of the railway lines is shown by the following table:

Years.	Length.	Capital invested.	Passengers.	Freight.	Receipts.	Expenses.
	Miles.	*$ o/s.*		*Metric tons.*	*$ o/s.*	*$ o/s.*
1865	155	5,379,898	747,684	71,571	563,134	438,961
1880	1,563	62,964,486	2,751,570	772,717	6,560,417	3,072,185
1890	5,861	321,842,815	10,069,606	5,420,782	26,049,042	17,585,406
1900	10,292	541,575,623	18,296,422	12,659,831	41,401,348	23,732,754
1910	17,392	900,430,051	59,014,600	33,606,626	110,941,406	65,929,627
1911	19,619	1,084,600,000	67,457,432	32,338,263	116,434,244	71,601,264
1912	19,793	1,120,210,000	73,212,084	38,869,804	129,700,178	81,348,088
1913	20,805	1,210,475,331	80,279,940	43,038,082	142,233,334	89,419,518
1914	[a] 21,398	1,236,723,022	81,745,535	35,378,830	118,751,420	80,474,190

[a] As of December 31, 1917, approximately 22,500 miles of line were open for traffic.

The valuation of the privately-operated railways is now placed at $1,219,846,313 o/s, while the lines owned by the Government represent an investment of approximately $153,000,000 o/s. Great Britain has approximately $1,000,000,000 o/s invested in the privately-owned lines, while France has the next largest sum at stake. As of December 31, 1915, there were 7,086 locomotives, 6,279 passenger-train cars, and 161,669 freight and service cars in service throughout the Republic.

All the successful railway lines in the Republic have their terminals either at Buenos Aires or at one of the other ports. This is the natural route of practically all traffic and will probably continue to be so for many years. The passenger density at Buenos Aires is very great, as may be gauged by the fact that no fewer than 500 outbound passenger trains leave the city daily.

The first railway in operation in Argentina was a 6-mile line extending from Buenos Aires to San Jose de Flores, chartered January, 1854, and constructed for the Sociedad Anónima del Camino Ferrocarril al Oeste. The line was opened to the public in January, 1857. The equipment consisted mostly of second-hand locomotives and cars that had been used at the siege of Sebastopol in the Crimea and had been constructed for an extremely broad gauge—namely, 5 feet 6 inches. The line was laid to accommodate these cars, and subsequent construction of this and other important railways has been carried on along similar lines.

During the first year of its existence the 6-mile railway earned $19,185 gross, its expenses totaling $12,448. The road and equipment cost $285,108. To-day the railway forms an important part of the Buenos Aires Western Railway, which will be discussed hereafter.

The first really important railway line in Argentina was constructed during the sixties by William Wheelwright, an American, famous as the founder of the Pacific Steam Navigation Co., and the builder of other railway lines in South America. This line, which to-day forms a portion of the Central Argentine Railway, extends from Rosario to Cordoba, 246 miles.

Most of the earlier railway lines carried guaranties of interest by the Government—some as high as 7 per cent per annum. In 1895 these guaranties were relinquished by mutual consent, the Government issuing to the railways 4 per cent rescission bonds in settlement thereof. These bonds are described in the section on Government loans.

In 1907 the Government passed what is known as the Mitre law, whereby railways, in lieu of customs duties and national and provincial taxes until 1947, pay to the Government 3 per cent of the net receipts, based on 60 per cent working expenses. This sum is used wholly to improve and construct roads and bridges to and from stations in the towns and districts served by the respective railways. The Government has the right to alter tariffs if the gross earnings of the railway, with operating expenses at 60 per cent, exceed 17 per cent on the recognized capital for three consecutive years.

The railway lines of Argentina have the right to construct extensions or branch lines, not to exceed 75 kilometers (47 miles) in length, without having to apply to the Government for permission, provided these lines are not within 20 kilometers (12½ miles) of any existing railway line belonging to another company. Several of the railways have taken advantage of the right to construct irrigation works adjacent to or near their lines, receiving payment therefor in Government 5 per cent bonds at par.

Owing to the increased cost of operation, the Government, late in 1917, granted permission to the railways to increase their tariffs 22 per cent.

CENTRAL ARGENTINE RAILWAY.

In discussing the important subject of railways it is necessary to give a brief history of the development of several of the most important systems of the Republic, beginning with the lines converging at Buenos Aires. Mention will first be made of the Central Argentine Railway. This is one of the longest and most important of the railways, serving as it does the larger cities and towns of the northern and central sections of Argentina, including Buenos Aires, Rosario, Cordoba, Santa Fe, Tucuman, etc., and crossing some of the best grain and cereal lands in the country. The railway to-day has a mileage of 3,305 and possesses the finest station and terminal in South America. From this, the Retiro Station, the main trunk line extends northward to Tucuman, a distance of 720 miles, running through the Provinces of Buenos Aires, Santa Fe, Santiago del Estero, and Tucuman. A number of divisional lines extend into the Province of Cordoba or act as feeders throughout the Provinces mentioned.

As previously stated, William Wheelwright, of the United States, constructed the Rosario-to-Cordoba section of this railway. He requested the concession at as early a date as 1854 and carried out a survey of the line under the supervision of Allan Campbell, also an American. Mr. Campbell's name is also identified with various early railway projects on the west coast of South America. Owing to the difficulty of obtaining financial aid, it was not until 1863 that the construction of the line was begun. The first section was completed in 1864 and the line to Cordoba in 1870.

From this somewhat modest beginning the system has been extended year by year. In 1903 the Buenos Aires & Rosario Railway was acquired, although the Government did not sanction the acquisition until 1908. This increased the mileage of the railway to 2,400 miles, and since that date another 900 miles has been added. At the outbreak of the war the company was carrying out an elaborate program of extensions. This expansion work has for the moment been curtailed but will doubtless be resumed when peace is established in Europe.

The principal freight traffic consists of cereals, but sugar, timber and firewood, live stock, wool, hides, hay, lime, and numerous other articles are also handled. The passenger traffic is very heavy, especially the suburban traffic. In view of this fact it was decided to electrify the lines adjacent to Buenos Aires for approximately 28 kilometers (17 miles). The system adopted provided for the multiple unit, third rail, and direct current, 800 volts. The company maintains its own power plant. Extensive workshops are maintained at Rosario and Perez, the latter only recently constructed. The Retiro Station at Buenos Aires has a frontage of 160 meters (525 feet) on the Avenida Maipu. The train shed contains 74,000 square meters (796,536 square feet), and 1,937 passenger trains are handled during one week at this terminal. The annual average number of passengers handled at the station exceeds 9,000,000.

There are a total of 409 stations on the railway and the equipment totals 679 locomotives, 787 passenger-train cars, 18,592 freight-train cars, and 836 service cars. Through express passenger service is maintained between Buenos Aires, Rosario, Tucuman, etc., and connections are afforded with the through Government line running to the Bolivian frontier at La Quiaca. The record year's passenger traffic was in 1913, when 21,721,273 passengers were carried—an average of 59,570 per day. About 9,000,000 tons of freight are handled, as well as about 2,000,000 head of cattle and other live stock. The growth of this great system during recent years is illustrated by the following table:

Items.	1902-3	1912-13	Increase.
			Per cent.
Average miles operated	2,316	2,994	29.3
Number of passengers carried	7,070,289	21,721,273	207.2
Tons of goods carried [a]	3,939,757	9,449,209	139.8
Tons of live stock carried	300,932	654,895	117.6
Gross receipts	£2,796,296	£6,489,346	132.1
Net receipts	£1,389,072	£2,770,411	99.4
Train miles	5,042,089	10,314,245	104.6
Accumulated reserve funds	£643,897	[b] £2,173,138	237.5

[a] Includes company freight.

[b] June 30, 1912; amount larger on June 30, 1913.

During the years 1911-12 to 1917-18 the gross receipts have been as follows:

Years.	Average miles operated.	Gross receipts.	Years.	Average miles operated.	Gross receipts.
1911-12	2,870	£5,223,815	1915-16	3,304	£5,787,093
1912-13	2,994	6,489,346	1916-17	3,305	5,237,700
1913-14	3,151	6,058,140	1917-18	3,305	6,153,200
1914-15	3,286	5,755,254			

The capitalization of the company consists of £28,196,950 consolidated ordinary stock, £811,800 deferred stock, £9,695,715 preference 4½ per cent stock, £13,436,764 debenture stock (4 per cent), £113,564 Central debenture stock, £2,017,500 Western annuity, $15,000,000 6 per cent notes (sold in the United States), and £500,000 6 per cent five-year notes, due September, 1922. For several years prior to the outbreak of the war in Europe dividends of 6 per cent were paid on the consolidated ordinary stock. This has been subsequently reduced.

The 6 per cent notes sold in the United States are dated February 1, 1917, and due February 1, 1927. They are payable in United States gold and are convertible into consolidated ordinary stock at par. The issue was offered by a syndicate of American bankers at par and interest. In July, 1918, they were quoted at 81.

The gauge of the railway is 5 feet 6 inches, the rails in the main track are of various weights up to 90 pounds, and the ties are of steel and hardwood.

Central Argentine consolidated ordinary stock, listed on the London Stock Exchange, sold as high as 120 in 1906 and above 110 on several occasions between 1910 and 1914. At the closing of the stock exchange July 27, 1914, the price was 92. In January, 1918, the price was 60. The deferred stock sold January, 1918, at 40—a price far below normal. The lack of a market outside of London has been a partial cause of the general decline in the company's securities. The 4 per cent debenture stock sold as high as 109½ since 1911; the price January, 1918, was 70 (par £100).

BUENOS AIRES GREAT SOUTHERN RAILWAY.

Equal in importance to any of the railways of Argentina is the Buenos Aires Great Southern Railway (which, like most of the large systems, is British owned), operating approximately 3,792 miles of road, extending from Buenos Aires to the south and southwest through vast areas of rich country fully or partly developed. The railway was first opened for service late in 1865 between Buenos Aires and Chascomus, 114 kilometers (71 miles). At that period the railway owned 5 locomotives, 19 passenger cars, and 124 other cars, and the capitalization was £750,000. To-day the system has grown to a total mileage of 3,793, with 679 locomotives, 739 passenger cars, and more than 16,000 other cars (including baggage cars). The capitalization is £53,838,090.

Upward of 90 per cent of this company's mileage is in the Province of Buenos Aires, the richest Province in the Argentine Republic. The railway reaches such important cities or ports as La Plata, Bahia Blanca, Mar del Plata, Ingeniero White, etc. The freight station, Sola, is the largest in South America, with a capacity for the storage of 230,000 bags of grain and 2,000 tons of other freight. The port of Ingeniero White, near Bahia Blanca, is equipped by the railway with a number of up-to-date electrical elevators for grain. There are seven loading belts on each side of the various elevators, capable of loading 300 tons per belt per hour, or 4,200 tons per elevator. By this method about 6,000 tons of grain can be handled in eight hours. Extensive shops and foundries are owned by the railway, and the line is laid with heavy rail and equipped in a thoroughly modern manner.

During recent years the company has constructed an important extension from Bahia Blanca westward through the plains of northern Patagonia to Neuquen and Senilossa, 480 miles. From this latter point an extension is projected to Pino Hachedo Pass, on the boundary with Chile, where connections will be afforded with a line to be constructed by the Chilean State Railways. This will complete a transcontinental system, with easy grades. Branch lines are to be constructed on this extension to Rio Colorado and Darwin, southward through the Province of Rio Negro, to Port San Antonio on the Gulf of San Matias, where a connection will be afforded with the Government's Patagonia Railway, partly constructed and projected to cross central Patagonia and extend southward to Lake Argentine, etc. The new line of the Buenos Aires Great Southern Railway to Neuquen and Senilossa is handling an excellent traffic, particularly in cattle. Important irrigation works have been carried out by the railway in the Rio Negro and Neuquen Valleys.

The Buenos Aires Great Southern Railway has its passenger terminus at Plaza Constitucion Station, Buenos Aires. Here approximately 350 trains are handled daily, including a number of express and de luxe trains to Mar del Plata, Bahia Blanca, etc. Between 25,000,000 and 30,000,000 passengers are handled annually in normal years. In 1913, a normal year, the railway also handled 6,592,581 head of live stock, 1,744,572 tons of wheat, 998,000 tons of maize, 837,000 tons of oats, 227,000 tons of potatoes, 922,000 tons of lime and stone, and 2,531,000 tons of general freight. The following table shows the earnings of the system since 1906–7:

Years.	Average miles operated.	Gross receipts.	Years.	Average miles operated.	Gross receipts.
1906–7	2,613	£4,254,009	1912–13	3,544	£6,569,345
1907–8	2,613	4,442,376	1913–14	3,655	5,464,588
1908–9	2,716	4,649,499	1914–15	3,763	4,941,621
1909–10	2,770	4,601,924	1915–16	3,792	5,549,140
1910–11	3,044	4,988,380	1916–17	3,792	5,728,000
1911–12	3,380	5,404,096	1917–18	3.792	5,816,000

The capitalization of the company consists of £20,090,000 ordinary stock, £8,000,000 5 per cent preference stock, £15,472,560 4 per cent debenture stock, £1,032,930 debenture stock (4½ per cent), issued to the Buenos Aires Western Railway in payment for the Saladillo Branch, and £242,600 4½ per cent debenture stock issued to the Buenos Aires Western Railway on account of the purchase of the Brandzen branch. The fixed interest-bearing obligations of the company form only one-third of the capitalization, and the margin of safety even in poor years is very large. The ordinary stock formerly received 7 per cent per annum in normal years, this rate being maintained for many years to 1912–13. In 1913–14 the rate was 5 per cent, and in 1914–15 it was 4 per cent. From the profits of 1915–16 the dividend declared was 4½ per cent. These shares sold as high as 148¾ in 1905, above 125 every year thereafter to 1913, and at 120 in 1914. At the closing of the London Stock Exchange, July 27, 1914, the price was 102. By April, 1916, the stock had declined to 80, and in January, 1918, had reached the price of 70. The excellent property that this stock represents would lead one to believe that the stock is on the "bargain counter." There have been heavy declines in all the other securities of the company. Most of these securities have been loaned to the British Government as part collateral for war loans. This company is said to have more than 100,000 stockholders on its books. Its London office is at River Plate House, Finsbury Circus.

BUENOS AIRES & PACIFIC RAILWAY AND ITS ACQUISITIONS AND EXTENSIONS.

Another of the great broad-gauge lines converging at Buenos Aires is the British-owned Buenos Aires & Pacific Railway. This company has been the most adventurous and ambitious of the various railways, and, as a result, operates the principal units of the only transcontinental line in South America. The company was formed in 1882 in London to purchase from the Argentine Government a line extending from Mercedes to Villa Mercedes. In 1886 an extension from Mercedes into Buenos Aires, 425 miles, was completed, and in 1900, 473 miles of additional lines were undertaken, these being completed between 1902 and 1907. In 1904 the Bahia Blanca & North Western Railway was acquired under a lease agreement. This line extends from Toay, a station on the "Pacific's" line, to Bahia Blanca, 231 miles, where important terminals and docks are owned. This terminal at tidewater, owned by the company, is known as Port Galvin and is built of masonry. Eight ocean steamers, each drawing 25 feet of water, may be accommodated, as well as one ship drawing 30 feet. Elevators with storage capacity of 18,000 tons, a produce market, sidings, electric cranes, and various other facilities are also owned. The Bahia Blanca & North Western Railway, after its acquisition, was extended (in the year 1907) to form a link in the route between Bahia Blanca and Mendoza—this extension, Nueva Roma to Huinca Renanco, being 287 miles in length. Various feeders and branches have since been thrown out from this and the main line, increasing the existing mileage to nearly 900 miles. The capitalization of the Bahia Blanca & North Western Railway is as follows:

Stock.	Amount outstanding.	High price since January, 1911.	Price January, 1918.
1. Guaranteed stock	£1,350,000	93½	63
2. 4½ per cent guaranteed stock	3,250,000	103	63
3. 4 per cent first debenture stock, redeemable	2,450,000	101	64
4. 4½ per cent second debenture stock, redeemable	3,000,000	103½	67

The guaranteed stock (1) received dividends of 3 per cent per annum from 1904 to 1908, 3½ per cent from 1909 to 1912, 4 per cent from 1913 to 1916 (July), and 4½ per cent thereafter.

Wheat, barley, oats, wine, maize, cattle, sheep, and general merchandise form the classes of freight handled by the Bahia Blanca & North Western Railway. The passenger business is not large in comparison with the freight earnings. The record year's business was in 1912–13, when gross earnings amounted to £836,036. The annual rental received by the company from the Buenos Aires & Pacific Railway amounts to about £450,000.

The Buenos Aires & Pacific Railway operates under agreement the Villa Maria & Rufino Railway, extending from Rufino on its line to Villa Maria, where junction is afforded with the Central Argentine Railway. Dividends of 4½ per cent are guaranteed on the £393,750 stock and interest on the £673,500 4 per cent first debenture stock. These securities sell at about 67 and 65, as compared with 91 and 94, the high prices during recent years. The length of this railway is 141 miles. The lease expires in 1920. The largest gross earnings during recent years were £77,308 in 1911.

During the year 1907 the Buenos Aires & Pacific Railway, deciding to continue its policy of expansion, leased the Argentine Great Western Railway, extending from Villa Mercedes, then the terminus of the "Pacific" line, to Mendoza, the most important city of western Argentina and the center of a rich wine-producing country. The Great Western Railway as it then existed had a length of 535 miles; to-day, owing to the construction of a new low-grade line and additional branches, the mileage totals about 950. The railway was originally built in 1885 and was acquired in 1887 by an English company.

The lease agreement between the Buenos Aires & Pacific Railway and the Argentine Great Western Railway provides that the Great Western 5 per cent cumulative preferred stock shares pro rata with the "Pacific's" first preference 5 per cent stock in all dividends up to 5 per cent per annum and will share pro rata with the latter's ordinary stock for dividends between 5 and 6 per cent; when this ordinary stock receives 7 per cent the rate on the Great Western's preferred stock will be 6½ per cent, which rate will be increased to 7 per cent in case dividends of more than 10 per cent per annum are paid on the "Pacific's" ordinary stock. The Great Western's ordinary stock shares equally with the "Pacific's" second preference stock up to 5 per cent and shares for additional dividends with the "Pacific's" ordinary stock under conditions similar to those governing the preferred stock, as above. Interest on all debenture stock issues is guaranteed by the "Pacific."

Dividends on the preference and ordinary stocks of the Great Western were maintained at the rate of 6 per cent per annum prior to the fiscal year 1908–9. In that fiscal year and subsequently, to and including 1913–14, the rate was 5 per cent on each class. In 1914–15 the rate was 5 per cent on the preference stock and 56s. 6d. on the ordinary stock. For 1915–16 the rate was 5 per cent on each class.

The capitalization of the Great Western is as follows:

Stock.	Amount outstanding.	High price since January, 1911.	Price January, 1918.
Ordinary stock	£2,125,000	110	49
5 per cent cumulative preference stock	2,125,000	116	70
4 per cent perpetual first debenture stock	1,700,000	105	68
4 per cent perpetual second debenture stock	1,700,000	102	64
5 per cent redeemable debenture stock	3,600,000	116	79
	11,250,000		

In the year 1909 the "Pacific" purchased from the National Government a line known as the Andine Railway, extending from Villa Mercedes to Villa Dolores, 215 miles. This line has been incorporated directly into the system. The Argentine Transandine Railway, a meter-gauge line of 111 miles, which forms a part of the mountain section of the ocean-to-ocean route, was acquired in 1907. This line extends from Mendoza up the mountain slope to the Chilean boundary, reached at an altitude of over 10,000 feet. The great tunnel connecting Argentina and Chile is 2 miles in length and cost a very large sum. Its date of completion, after several years of construction, was 1910.

The Argentine Transandine line was originally surveyed by John and Matthew Clark in 1873. Several years prior to that date these brothers had surveyed a route for a transcontinental telegraph line and at that time had conceived the idea of a through railway following approximately the route later adopted. It was not until 1886 that a company was formed to construct the mountain section of the through route. This company was known as the Buenos Aires & Valparaiso Transandine Railway, the name subsequently being changed to the Argentine Transandine Railway. A total of 91 miles of the line, Mendoza to Puenta del Inca, was constructed prior to December 31, 1893. It was not until April 16, 1910, that through trains were operated across the continent.

The Transandine is capitalized approximately as follows:

Stock.	Amount.	High price since January, 1911.	Price, January, 1918.
4 per cent "A" debenture stock (guaranteed principal and interest by the "Pacific")	£310,166	96	65
4 per cent "B" debenture stock (interest dependable on income is regularly paid)	310,166	83	55
7 per cent cumulative preferred stock (£387,500 dividends in arrears to Dec. 31, 1917)	500,000	[a]20	8
7 per cent deferred stock (no dividends)	350,000	....	....
Total capitalization	1,470,332		

[a] Par £20.

The preferred stock has received only 6 per cent in dividends since 1906, the last dividend of 3 per cent having been paid in December, 1913.

In addition to the various acquisitions and extensions enumerated in the preceding paragraphs, the Buenos Aires & Pacific Railway has otherwise extended and double-tracked the system in various places. An important extension has been constructed, known as the Patagonas Extension, extending from Bahia Blanca southward to Carmen de Patagonas, 167 miles, at the mouth of the Rio Negro. This will give the system access to northern Patagonia. Land is being irrigated along the Patagonas division by means of canals brought from the Colorado River, and the "Pacific" is making endeavors to attract colonists to the district.

The earnings of the entire Buenos Aires & Pacific Railway, covering a period of years, have been as follows:

Years.	Average miles operated.	Gross receipts.	Years.	Average miles operated.	Gross receipts.
1910–11	3,114	£4,820,841	1914–15	3,527	£4,538,943
1911–12	3,240	4,976,651	1915–16	3,535	4,645,000
1912–13	3,404	5,590,613	1916–17	3,535	4,414,000
1913–14	3,473	4,881,665	1917–18	3,535	5,221,000

The company is capitalized as follows (not including the capitalization of the Argentine Great Western Railway, the Bahia Blanca & North Western Railway, and the Argentine Transandine Railway):

Stock.	Rate.	Amount outstanding.	High price since 1911.	Price, January, 1918.
	Per cent.			
Ordinary stock	[a] ½	£10,000,000	101	40
First preference stock (cumulative)	5	1,200,000	115	70
Second preference stock (noncumulative)	[b] 5	1,000,000	107	51
Perpetual first debenture stock	4	2,925,000	106	71
Redeemable second debenture stock	4½	2,075,000	108	71
Consolidated debenture stock	4½	7,942,673	108	70
Debenture stock	5	4,000,000	107	75
Total		27,142,673		

[a] See paragraph below for dividend rates.
[b] Compares with 56s. 6d. in 1914–15 and 5 per cent per annum in previous years.

Guaranties and other forms of rent paid by this company to leased and controlled lines amount to nearly £1,000,000 per annum.

According to the figures in the annual report of the company for the year ended June 30, 1916, the income account showed the following results: Operating revenue, £4,655,019; operating expenses, £2,846,986; net revenues, £1,808,033; other income, £241,000; net income, £2,049,033; fixed charges, £1,621,000; surplus, £428,033.

Despite the handicap of heavy guaranties and relatively large fixed charges, it may be said that this property is a magnificent one. It may possibly be a little ahead of its time, but following the influx of settlers after the end of the war in Europe, the country traversed by the line is certain to develop with considerable rapidity.

The dividend rate on the ordinary stock has been as follows: To and including 1908, 7 per cent; 1909, 5 per cent; 1910, 3 per cent; 1911, 3½ per cent; 1912, 2 per cent; 1913, 3 per cent; 1914–15, none; 1916, ½ per cent.

BUENOS AIRES WESTERN RAILWAY.

This system, which has had probably the longest record of continuous prosperity of any railway in the Argentine Republic, stands fourth in importance. Its present mileage is 1,870, and it has the distinction of being the outgrowth of the oldest system in Argentina. The line extends westward from Buenos Aires into the districts of Pampa and San Luis, and it is primarily a freight-carrying road, although a very substantial passenger business is handled and a large passenger terminal is owned—the Once Station, in the heart of Buenos Aires. An extensive goods tunnel carries the freight to the port, and the passenger station is located directly on the Anglo-Argentine Subway, affording quick connections with the business sections of the city. A portion of the suburban lines is operated by electricity. Plans are laid for the construction of a large mileage of branches and feeder lines.

Jointly with the Buenos Aires Great Southern Railway, the "Western" has leased the Buenos Aires Midland Railway, extending from a suburb of Buenos Aires to Carhue, 320 miles. Three per cent per annum was guaranteed to the shareholders (both classes) from 1914 to June 30, 1916, the rate thereafter to be 4 per cent per annum. The Buenos Aires Western Railway paid to the Midland in 1915–16, as per working agreement, the sum of £68,296. The capitalization of the Midland consists of £500,000 ordinary stock, £1,000,000 preference stock, par value £1, which sells (January, 1918) at approximately 13s. per share, and £1,559,010 4 per cent debenture stock, selling (January, 1918) at about 69 (high since 1911, 105 per cent). The full amount of rental has not thus far been earned by the company. Prior to the date of the lease a large majority of the ordinary stock was owned by the two lessees.

During the year 1912–13, in which record earnings were shown, the Buenos Aires Western Railway carried 7,345,845 head of live stock, 2,896,015 tons of freight, and 11,462,842 passengers. In 1914–15 a total of 8,830,106 passengers were handled, and in 1915–16 the number decreased to 8,138,189. The live stock handled during these two fiscal years numbered 7,018,867 and 6,781,262, and the freight tonnage was 2,089,975 and 2,049,096.

Gross receipts covering a period of years have been as follows:

Years.	Average miles operated.	Gross receipts.	Years.	Average miles operated.	Gross receipts.
1907–8	1,219	£2,205,237	1913–14	1,792	£2,529,178
1908–9	1,305	2,296,860	1914–15	1,867	2,522,682
1909–10	1,365	2,300,510	1915–16	1,870	2,714,622
1910–11	1,586	2,634,186	1916–17	1,870	2,513,000
1911–12	1,659	2,425,683	1917–18	1,882	2,865,000
1912–13	1,781	2,906,008			

Wheat, maize, hay, and other agricultural products form the bulk of the traffic handled.

For a long period prior to 1910–11 the dividend rate on the ordinary stock was 7 per cent per annum; in 1910–11, 7 per cent and $\frac{1}{2}$ per cent extra was paid; in 1911–12 and 1912–13 the rate was 7 per cent; in 1913–14, 1914–15, and 1915–16, 5 per cent per annum was paid.

Rolling stock in service June 30, 1916, consisted of 347 locomotives, 432 passenger-train cars, 9,341 freight-train cars, and 184 service cars.

Quotations on the various securities of the company follow:

Securities.	Rate.	Amount outstanding.	High price since January, 1911.	Price January, 1918.
	Per cent.			
Preference shares (£10 par)	4½	£2,552,340	[a] 11⅛	7
Do	5	300,000	[a] 12½	8
Ordinary shares	5	17,347,660	135	71
Government bonds, 1888 issue	5	1,000,000	([b])	([b])
Debenture stock	4	7,872,203	105	72
Terminable (1925) debenture stock	5	1,000,000	....	94
Capitalization	....	30,072,203	....	....

[a] Par £10. [b] This issue is not quoted.

The Buenos Aires Western Railway is an excellent property and has been kept in a high state of maintenance, despite the traffic losses due to the business depression throughout the Republic. Its territory is an extremely rich one and its management is of the best.

CORDOBA CENTRAL RAILWAY.

This British-owned system is the result of the amalgamation of five different lines, four of which were at one time operated by separate companies. These lines were distinguished as follows: Cordoba Central Original Line; Cordoba Central Railway Central Northern Section; Cordoba Central Railway Buenos Aires Extension; Cordoba & Rosario Railway; Argentine North Western Railway.

The Original Line was constructed following the acquisition of the concession in 1888 by the present owners. This section is about 129 miles in length and extends from the city of Cordoba to the town of San Francisco on the eastern boundary of the Province of Cordoba, connection being afforded at the latter place with the Province of Santa Fe Railway and with the Cordoba & Rosario Railway. At Cordoba connections are afforded with the Government's Argentine Northern Railway and with the Cordoba Central Northern Extension. The country served by this division is prosperous and well settled, and this is probably the most important section of the system.

The Central Northern Section was originally known as the Central Northern Railway and was built following the granting of the original concession in 1871. The railway was acquired by its present owners in 1889. Its present length is 546 kilometers (339 miles), and it extends from Cordoba northward to Tucuman. There are two important branch lines, one extending from Recreo to Chumbicha, 176 kilometers (109 miles), and the other from Frias to Santiago del Estero, 162 kilometers (101 miles). At Tucuman the main line connects with the Central Northern Railway (Government), which runs northward to the Bolivian frontier and will eventually afford direct connections with a through line to Oruro and La Paz. The gauges on the Government line and on the Cordoba Central are the same (1 meter). A large tract of sugar country is traversed. Timber, cattle, stone, lime, and salt are also important items of traffic.

The Cordoba Central Buenos Aires Extension was constructed following the granting of a concession in the year 1903 and forms a through extension of the system from Rosario to Buenos Aires, 300 kilometers (186 miles). The line was opened for provisional traffic in 1909 and for all traffic in 1912. The extension, although quite costly, will probably in time prove of great benefit to the system, providing, as it does, an outlet for through traffic to Buenos Aires. Once the small mileage of uncompleted track is laid in Bolivia, this line will form the southern terminus of a direct through system between La Paz, Oruro, and Uyuni on the north and Buenos Aires on the south. Furthermore, no change of gauge will be necessary.

The Cordoba and Rosario section, extending between these two points, was the result of a concession granted in 1886. The section handles a substantial traffic in cereals, destined for exportation from Rosario and Buenos Aires. This is a most important division.

The northwestern division passes through large sections of the sugar lands in the north. While not the most important of the various sections, it nevertheless furnishes considerable traffic.

The capital invested in the enterprise to June 30, 1915, amounted to £20,419,222. The mileage as of that date was 1,186 and the number of stations 143. There were 297 locomotives, 314 passenger cars, not including the baggage equipment, and 7,383 other cars. There were carried during the year 2,199,893 passengers and 2,778,527 tons of freight. A table of earnings over a period of several years is here given:

Years.	Average miles operated.	Gross receipts.	Years.	Average miles operated.	Gross receipts.
1909-10	1,149	£911,605	1914-15	1,186	£1,202,625
1910-11	1,170	1,000,371	1915-16	1,186	1,543,991
1911-12	1,172	1,199,243	1916-17	1,205	1,562,000
1912-13	1,176	1,363,700	1917-18	1,205	1,701,700
1913-14	1,184	1,347,998			

The capitalization of the Cordoba Central Railway is as follows:

Securities.	Amount outstanding.	High price since 1911.	Price January, 1918.
Ordinary income stock	£4,068,616	97⅞	13
5 per cent cumulative first preference income stock	1,440,000	119	30
5 per cent second preference income stock	1,661,895	85	17
4 per cent first debenture stock	8,000,000	98	59
4½ per cent second debenture stock	5,000,000	100	44
Deferred warrants	[a] 133,100	....	34
Notes, 6 per cent	248,600	(*b*)	(*b*)

[a] June 30, 1916; amount since increased. [b] Not quoted.

The company suffered severely following the outbreak of the European war and has not yet fully recovered. Net receipts for 1915–16 totaled £492,200 and fixed charges were £579,100, of which £133,100 were met by means of deferred certificates authorized early in 1916 under a funding scheme. Gross receipts for 1916–17 were approximately £28,000 larger than in 1915–16, and a moderate increase in net receipts resulted. In 1917–18 there was an increase of £139,700 in the gross receipts. The system is being operated as economically as possible without lowering the standard of maintenance, and every effort is being made to put the property on a thoroughly firm basis. The railway is a good one, and is earnestly endeavoring to please its patrons by rendering good service. The company was seriously affected by the collapse of the Argentine Railway (see p. 61), which had taken it over on what were believed to be favorable terms, and, owing to the outbreak of the war shortly after the event just mentioned, it was unable fully to recover. The amount invested in the undertaking thus far exceeds £20,000,000, including the approximate sum of £3,200,000 expended on the Buenos Aires extension, with its terminals and substantial passenger station at Buenos Aires. This extension, although much criticized, will probably in time prove the salvation of the property.

ENTRE RIOS RAILWAY.

This is a British-controlled railway, 831 miles in length, forming a portion of the through route from Buenos Aires to Asuncion. Its southern rail terminus is at Ibicuy on the Parana River, where it connects via car ferry with the Buenos Aires Central Railway, over whose tracks the international trains are carried into Buenos Aires. The present Entre Rios Railway Co. acquired the property, then 379 miles in length, in the year 1892, this property consisting mostly of the Central Entrerriano (Government) Railway. In 1895 the Primer Entrerriano Railway, Gualeguay Central to Puerto Riaz, was taken over; in 1898 a line from Villaguay to Concordia was opened; and in 1902 a large number of branches were completed, as well as the deep-water port of Ibicuy. The gauge of the line is 4 feet 8½ inches.

In October, 1912, the Entre Rios Railway was leased to the newly formed Argentine Railway, which company has since passed into the hands of receivers. There is little likelihood that the terms of the lease will be carried out.

The capitalization of the Entre Rios Railway is as follows:

Securities.	Amount outstanding.	High price since 1911.	Closing price January, 1918.
Ordinary stock	£1,783,140	88	25
5 per cent first preference stock (cumulative)	2,000,000	105	69
4 per cent second preference stock (noncumulative)	734,049	81	34
4 per cent debenture stock (redeemable)	1,505,000	99	64
5 per cent debentures (redeemable)	700,000	107	78
5 per cent consolidated debenture stock (redeemable)	1,303,000	97½	71

The ordinary stock received a 1½ per cent dividend in 1911, but none since. The first and second preference stocks received regular dividends of 5 per cent and 4 per cent, respectively, until 1914; since the outbreak of the European war no dividends have been paid on either class of preference stock.

The following table shows the earnings of the railway over a period of years:

Years.	Average miles operated.	Gross receipts.	Surplus after charges.
1911-12	688	£472,101	£89,282
1912-13	730	611,145	117,320
1913-14	742	609,850	135,010
1914-15	730	437,630	(a)
1915-16	799	612,433	67,472

a Deficit of £61,043.

In 1916–17 the gross receipts totaled £644,900, and the mileage operated was 831. For the year ended June 30, 1918, the gross receipts amounted to £857,900—showing the very substantial increase of £213,000 over the figures for the preceding year.

The following statistics indicate the development of road and equipment during the period from February, 1892, to June 30, 1915:

Items.	1892	1915
Miles of line open	379	730
Locomotives	23	94
Passenger cars	51	111
Freight cars	402	2,166
Ferryboats (car ferries)	....	3

The Entre Rios Railway is largely interested in the Argentine North Eastern Railway.

ARGENTINE NORTH EASTERN RAILWAY.

This company's lines extend throughout the Provinces of Entre Rios and Corrientes and into the Territory of Misiones. A large section of the railway forms an integral part of the route from Buenos Aires to Asuncion, Paraguay. A rapidly developing section of Argentina is served. The existing mileage is 752, the gauge being 4 feet 8½ inches, and a large additional mileage is projected.

The railway had the misfortune to complete and open for traffic large sections of new mileage just before the outbreak of the war in Europe. This had led to the issuance of substantial amounts of secured notes and loans. Gross and net revenues for the fiscal year ended June 30, 1915, were £108,000 and £60,000 less than for 1912–13. International traffic receipts, owing to existing conditions in Paraguay, did not come up to expectations, and this brought about a reduction in through passenger and freight train service and a natural decrease in revenue. In order to meet interest requirements on certain debenture issues and the temporary loan, a funding scheme was carried out whereby funding scrip certificates were issued in lieu of cash for interest payments.

The capitalization of the system as of June 30, 1916, was as follows:

Stock.	Amount.	High price since January, 1911.	Price January, 1918.
Ordinary shares (par £20)	£2,768,500	60	23
5 per cent "A" debentures and "A" debenture stock	1,200,000	112	79
5 per cent "B" debentures and "B" debenture stock	992,229	105	70
"C" debentures and debenture stock	1,023,750	92	42
	5,984,479	....	....

The earnings of the Argentine North Eastern Railway over a series of years have been as follows:

Years.	Average miles operated.	Gross receipts.	Years.	Average miles operated.	Gross receipts.
1910-11	614	£293,023	1914-15	708	£259,627
1911-12	665	319,312	1915-16	752	328,716
1912-13	665	367,025	1916-17	752	389,100
1913-14	666	348,489	1917-18	752	457,600

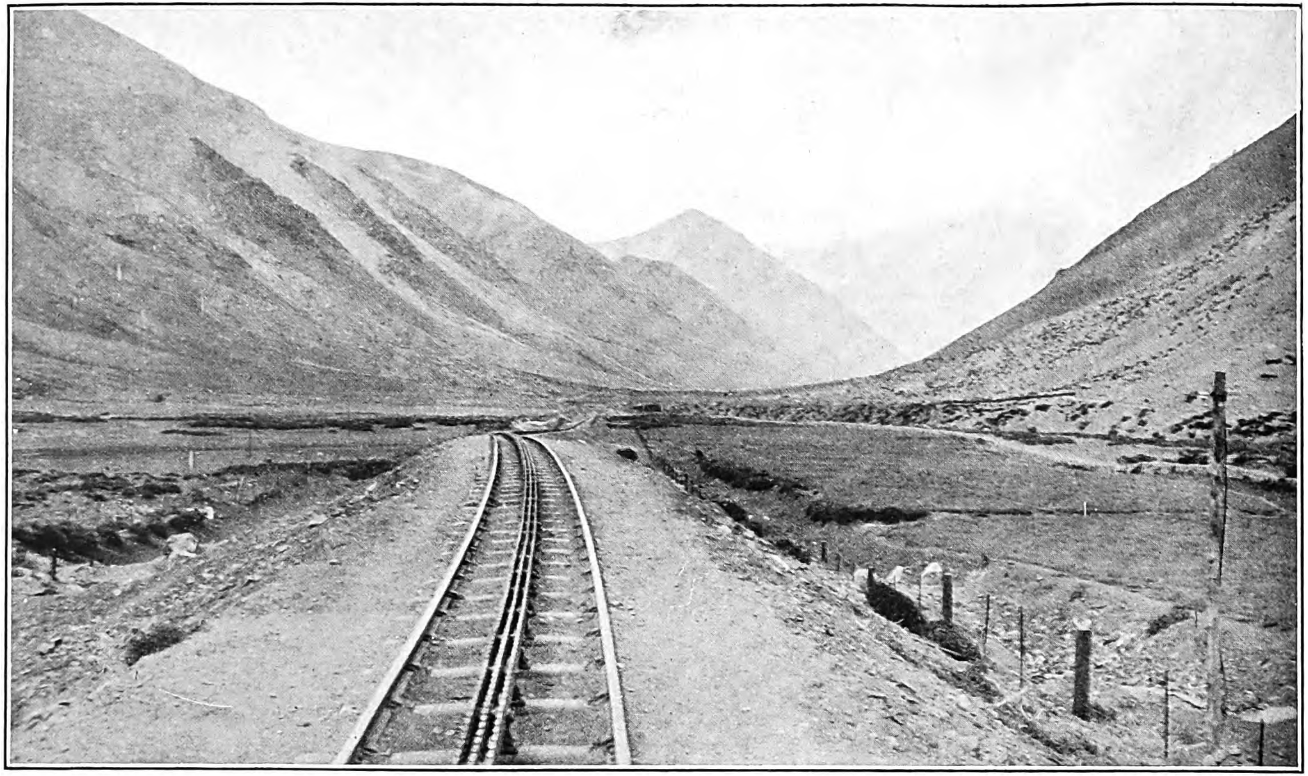
It will be noted that gross receipts for 1915–16, as compared with 1914–15, showed an increase of approximately £69,000. Net receipts showed an increase of £60,000, and, after paying interest in full on the "A" debentures and stock and putting aside £20,000 for renewals, the company was able to meet the interest on the " B " debentures and stock for the second half of the year, interest for the first six months being paid in the funding scrip certificates. In 1916–17 and 1917–18 gross earnings showed further increases, and it is likely that the final returns will show substantial net increases, reflecting the better prospects of the property. Cattle traffic is now breaking all records, and a very large number of oranges are being handled. The amount of passenger traffic is fair, with prospects of increase owing to the fact that train service to Paraguay has recently been increased from one to two trains per week in each direction. The number of passengers carried during 1915–16 was 169,291, as compared with 263,171 during 1912–13. Dining cars and sleeping cars are carried on through trains.

The amount of equipment in service June 30, 1916, was as follows: Locomotives, 68; passenger-train cars, 96; freight-train cars, 1,270; ferryboats, 2. Sleeping cars and dining cars number 10 and 7, respectively.

The ferries engaged in traffic with Paraguay made 1,158 trips during 1915–16, as compared with 628 trips during 1914–15. There were 29,862 tons of freight received from and 893 tons shipped to Paraguay during 1915–16, as compared with 13,564 tons and 787 tons the year previous. A total of 26,848 head of live stock were carried. Passengers interchanged totaled 2,660.

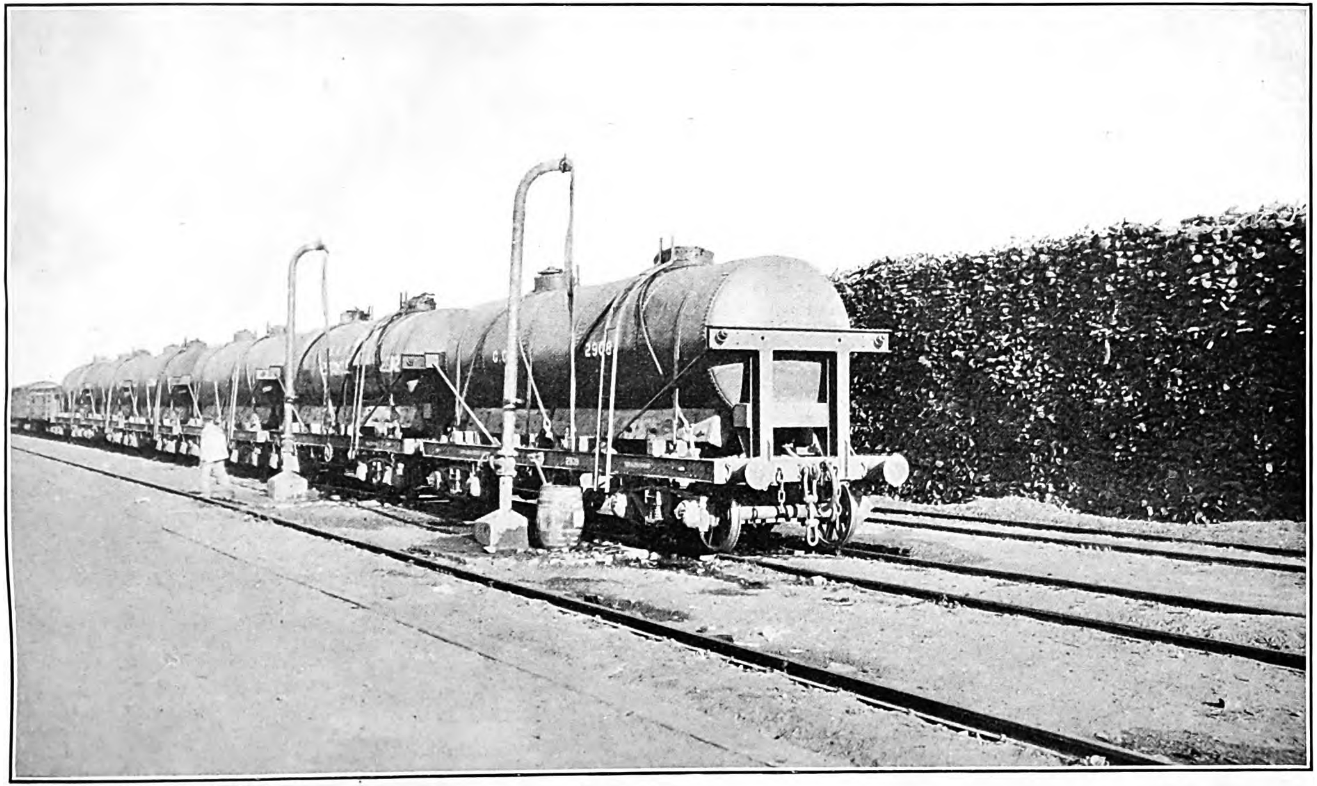
CENTRAL RAILWAY OF THE CHUBUT CO.

There is one other British-controlled and directly operated railway property in Argentina, namely, that of the Central Railway of the Chubut Co., incorporated in 1886 to construct a railway extending from Port Madryn, one of the chief Patagonian ports, to Trelaw and Gaiman. The line is about 51 miles in length and serves an important section largely settled by Welsh colonists. At Port Madryn a substantial iron pier is owned. Extensions of this line have been contemplated for some time to carry the system across the Republic to the foothills of the Andes. The company during past years has paid a number of substantial dividends on its stock, which is outstanding to the amount of £200,000. The £1 shares recently sold at 7s. a share, a price far below the high record. The 6 per cent debentures of the company are outstanding to the amount of £125,000. The gross receipts of the property have been as follows: 1911–12, £35,184; 1912–13,



Photograph by P. S. Penfield.

FIG. 4.—SCENE FROM PUENTE DEL INCA, SHOWING MOUNTAINS OF ARGENTINE ANDES AND SECTION OF COG RAILWAY.



Photograph by P. S. Penfield.

FIG. 5.—BUENOS AIRES & PACIFIC RAILWAY: WATER TANK CARS AND STACKS OF WOOD BURNED IN LOCOMOTIVES.

£40,052; 1913–14, £37,950; 1914–15, £28,526. The figures for 1915–16 and 1916–17 are not available.

ARGENTINE RAILWAY.

This company was incorporated in July, 1912, with a very broad charter. Interests were acquired or leases effected of several properties, including the Cordoba Central Railway, the Argentine North Eastern Railway, the Entre Rios Railway, the French Railway of the Province of Santa Fe, the Rosario & Puerto Belgrano Railway, and others. Owing to the crisis brought about by the war receivers were appointed for the company. The two-year notes of the company were quoted January, 1918, at about 56. Just what methods will be followed in the reorganization of the property (if it is to be reorganized) is at present uncertain. A number of the properties have been returned to their original owners. In addition to the railways mentioned, various land, cattle, and development properties were acquired by the Argentine Railway and were operated. The Argentine Railway is officially incorporated in Maine, and its preferred stock was listed on the Baltimore Stock Exchange. Very little American capital is invested in the enterprise.

FRENCH RAILWAY OF THE PROVINCE OF SANTA FE.

France, like Great Britain, has been attracted to Argentina as a country offering opportunities for the establishment and construction of railways. The principal so-called French lines in the Republic are the French Railway of the Province of Santa Fe (Cia. Francesa de Ferrocarriles de la Provincia de Santa Fe), the Province of Buenos Aires Railway, and the Rosario & Puerto Belgrano Railway. Of these various lines the most important and financially successful is the Province of Santa Fe line.

The original concession for the railway was granted by the Government in 1882 to John Meiggs & Sons, of London, the concession calling for the construction of 815 kilometers (506 miles) of line. This concession was acquired in 1888 by a French company known as the Compagnie Fives-Lille, which later in the year transferred it to its present owners. Year by year this company expanded the system, reaching into new territory capable of development and bringing a large immigrant population to the district. On December 31, 1909, the length of the lines amounted to 1,709 kilometers (1,062 miles). Between that period and June 30, 1915, 192 kilometers (119 miles) more were built, while concessions were held calling for the construction of an additional 274 kilometers (170 miles). The earnings of the system over a period of years have been as follows:

Years.	Approximate capital invested.	Gross receipts.	Dividends.
	$ m/n.	*$ m/n.*	*Per cent.*
1908–9	85,087,573	12,530,266	3¾
1909–10	88,735,951	12,353,505	....
1910–11	93,338,936	13,445,093	4¾
1911–12	101,515,013	13,153,215	8
1912–13	109,897,853	13,791,335	7½
1913–14	116,519,124	12,904,841	2
1914–15	117,510,073	9,879,194	None.
1915–16	119,501,786	11,388,736	None.

The shares are listed on the Bourse in Paris, and the bonds, which bear interest at 3 and 4½ per cent per annum, are listed in Paris and London. The amount of bonds listed in London is £607,400. In January, 1918, they were quoted at 55, as compared with 63 at the time of the closing of the London Stock Exchange at the outbreak of the war.

Owing to various causes this company, since the year 1912–13, has found it impossible to meet the normal minimum interest upon the capital invested in its system. In 1914 the dividend paid upon the shares fell to 10 francs per share, equivalent to 2 per cent interest. In 1915 no interest whatever was paid to shareholders, nor did they receive any in 1916. During the 28 years of the company's existence, in two only has it been enabled to pay a dividend of more than 5 per cent. During 13 years it was possible to pay dividends varying between 0.84 and 4.76 per cent, while 13 financial years closed without the shareholders receiving any dividend at all in compensation for the capital invested.

In 1914 the financial situation of the company had become particularly critical. Without the assistance of its bankers in Paris it would have been unable to meet its most pressing charges and would have been obliged to suspend payments.

Since then not only has the company had to meet the fixed debenture charges but also (1) the expenditure necessary for reestablishing that part of the lines which was destroyed by the inundations of 1914 and 1915 and (2) maintenance expenses, demanded by official control or judged to be indispensable. The amounts thus invested have been as follows:

Financial years.	Maintenance expenses.	Expenses caused by floods.
	$ m/n	*$ m/n*
1913–14	6,375,775	476,324
1914–15	948,992	709,408
1915–16	1,991,713	278,819
1916–17	1,002,000	190,509
Total	10,318,480	1,655,060
General total	....	11,973,540

An issue of bonds at short date was made in 1916. By this means the company raised from 5,000,000 to 6,000,000 francs amortizable in 10 years.

The following tables show statistics of working results, proceeds, and cost of fuel:

WORKING RESULTS.

Years.	Working expenses.			Operating ratios.[a]			Net profits on capital invested.[a]		
	Excluding contributions to renewal fund.	Including contributions to renewal fund.	Including contributions to renewal fund to extent allowed by Law 5315.						
	$m/n	*$m/n*	*$m/n*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
1909-10	6,847,677	7,677,543	7,677,543	55.43	62.15	62.15	6.20	5.26	5.26
1910-11	6,955,846	7,921,532	7,921,532	51.73	58.92	58.92	6.95	5.91	5.91
1911-12	7,550,908	8,413,959	8,413,959	57.40	63.97	63.97	5.51	4.66	4.66
1912-13	7,795,433	8,456,108	8,621,277	56.52	61.31	62.51	5.45	4.85	4.70
1913-14	7,574,789	7,795,768	8,486,227	58.69	60.41	66.80	4.57	4.38	3.79
1914-15	7,426,777	7,451,317	8,267,793	75.17	75.42	83.69	2.08	2.06	1.37
1915-16	7,574,492	7,876,090	8,520,695	66.51	69.16	74.81	3.19	2.93	2.39

[a] The three columns of percentages under these headings correspond, respectively, to the three columns under "Working expenses."

AVERAGE RECEIPTS, GENERAL TRAFFIC.

Years.	Kilometric tons.	Receipts per kilometric ton.	Net proceeds per kilometric ton.
		$m/n	*$m/n*
1911-12	368,000,000	0.035	0.012
1912-13	404,000,000	.034	.013
1913-14	390,000,000	.033	.013
1914-15	317,000,000	.031	.008
1915-16	391,000,000	.029	.009

COST PER TON OF FUEL FOR RAILWAY.

Years.	Wood.	Coal.	Years.	Wood.	Coal.
	$m/n	*$m/n*		*$m/n*	*$m/n*
1912-13	5.50	23.03	1915-16	9.50	31.48
1913-14	6.00	22.86	1916-17	10.50	43.41
1914-15	8.00	23.34	July, 1917	11.50	46.50

A recent statement indicated that the company had in service 160 locomotives, 284 passenger-train cars, and 5,643 freight-train cars. Nineteen sleeping cars and 9 dining cars were included in the passenger equipment. The railway handles a large tonnage of cereals, sugar, live stock, timber, etc. The gauge of the system is 1 meter. Among the extensions projected is a line to Asuncion, Paraguay.

PROVINCE OF BUENOS AIRES RAILWAY.

This company operates a railway approximately 1,287 kilometers (800 miles) in length, extending through various sections of the Province of Buenos Aires. Among the lines operated is one from Buenos Aires to Rosario, 377 kilometers (234 miles) a somewhat longer route than the Central Argentine Railway's two lines and the Cordoba Central Railway. This section is also connected via a branch with the port of La Plata. The company's concession allows for the construction of an extension to Bahia Blanca. For the year ended June 30, 1918, the system reported gross receipts amounting to $16,587,000 m/n, as compared with $13,555,000 m/n in 1916–17. The capital investment in the property exceeds $40,000,000 United States currency, on which sum only a small return has been earned thus far. The original concession for the construction of these lines was granted September 26, 1904, and the first section was opened to traffic early in 1908. A total of 1,088,160 passengers and 878,370 tons of freight were handled in 1914 (a normal year). The shares and debentures of this company are listed on the Paris Bourse. The company has port facilities at Rosario, La Plata, and Riachuelo. An extension runs from Buenos Aires in a southwesterly direction to Salliquelo, near the western boundary of the Province. This line parallels the Buenos Aires Midland Railway. Another extension runs from Patricos on the Salliquelo line to Villagas, near the northeastern corner of the Province. The La Plata branch reaches the important coal docks and wharves in the city. The equipment in service amounts to approximately 70 locomotives and 1,800 cars of various descriptions.

ROSARIO & PUERTO BELGRANO RAILWAY.

This company was incorporated in Paris in 1906 to build a broad-gauge (5-foot 6-inch) railway to extend from Rosario in a southerly direction to Puerto Belgrano, a short distance eastward from Bahia Blanca. It was expected that the line would serve as a route for the interchange of considerable traffic between the various broad-gauge lines extending from Buenos Aires and points in the interior. The line is 493 miles in length, and its gross earnings for 1917–18 amounted to $2,567,200 m/n, as compared with $2,314,700 m/n in 1916–17. Following the incorporation of the Argentine Railway in 1912, this company was to have formed a part of that system, an option on the stock having been obtained. The capitalization consists of 50,000,000 francs stock and 137,500,000 francs 5 per cent debentures of a par value of 250 francs. The line was opened for traffic in 1911. This is the only broad-gauge line owned by a French company.

BUENOS AIRES CENTRAL RAILWAY.

This is the most important of the locally controlled railway systems. A total of 252 miles of line is operated, including the line from Chacarita Station, Buenos Aires, to Zarate, from which point a car ferry connects with the Entre Rios Railway, which in turn routes traffic to the Argentine North Eastern Railway, these three companies forming the Argentine section of the through route from Buenos Aires to Asuncion, Paraguay. Another extension runs to Salta, Rojas, etc.

The capitalization consists of $20,165,000 m/n shares of a par value of $500 m/n, most of which are held in Argentina, as well as £700,000 4½ per cent debentures and £600,000 5 per cent debentures, held largely in Great Britain. Dividends of 2 per cent and 3½ per cent were paid in 1914–15 and 1915–16 on the stock. The debentures are quoted on the London Stock Exchange, as follows: Four and one-half per cent first debentures—High since 1911, 100; price January, 1918, 72. Five per cent second-mortgage debentures—High since 1911, 96; price January, 1918, 77.

During the years 1913–14 to 1917–18 gross earnings have been reported as follows:

Years.	Mileage operated.	Gross receipts.	Years.	Mileage operated.	Gross receipts.
1913–14	175	£289,114	1916–17	252	£312,620
1914–15	230	244,844	1917–18	252	383,305
1915–16	252	290,580			

Net receipts during the year 1915–16 amounted to £149,640, the operating ratio having been 48.5 per cent; £881 was carried forward from 1914–15, and other income from various sources brought the total receipts to £156,214. Interest requirements were £61,500 and net profits totaled £94,714 ($1,084,908 m/n), equal to more than 5 per cent on the company's stock. The traffic consisted of 218,631 passengers (as compared with 339,846 in 1914–15), 358,519 head of live stock (mostly cattle and sheep), and 462,524 tons of freight (largely agricultural products).

ECONOMIC RESULTS OF FOREIGN RAILWAY INVESTMENTS.

A description has been given of practically all the privately operated railway systems in Argentina. As may readily be seen, British investors are the important holders of the railway shares. Although at the present time these British-held lines are not enjoying their usual prosperity, it is clearly apparent that, covering a period of a dozen years, the returns on sums invested have been very substantial. The results have not been confined to the dividend and interest returns. British rolling stock is employed on the railways of the Republic, the locomotives are propelled by British coal, and the trains run over British rails, with British rail joints, spikes, etc. Hundreds of British subjects have obtained remunerative positions with these companies, and the British nation has otherwise reaped substantial advantages from these enterprises. Probably there is no better illustration of the axiom "Trade follows the invested dollar" than the British-owned railways of the Argentine Republic.

TOTAL PAYMENTS OF DIVIDENDS AND INTEREST ON SECURITIES.

The following statement shows the total payments of dividends and interest for the fiscal year 1915–16 on shares and debentures of foreign railways operating in Argentina:

Central Argentine Railway	£2,356,018
Buenos Aires Central Railway (interest on debentures; stock held in Argentina)	67,500
Buenos Aires Midland Railway	[a] 107,360
Buenos Aires Western Railway	1,455,307
Buenos Aires Great Southern Railway	2,659,651
Province of Buenos Aires Railway	([b])
Buenos Aires & Pacific Railway	977,795
Argentine Great Western Railway	369,125

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[a] Approximately correct.

[b] For several years dividend and interest payments have been only nominal.

Argentine Great Western Railway	£31,631
Bahia Blanca & North Western Railway	440,750
Villa Maria & Rufino Railway	42,690
Entre Rios Railway	160,350
Cordoba Central Railway	441,527
Argentine North Eastern Railway	87,047
Central Railway of the Chubut (Patagonia)	[a] 15,000
Province of Santa Fe Railway	(b)
Rosario & Puerto Belgrano Railway	(b)
Total	9,211,751

Additional statistical data concerning the privately owned railways of Argentina will be found in the Appendix (p. 483).

GOVERNMENT RAILWAYS.

The subject of State-owned railways in Argentina does not directly interest the investor other than the holder of governmental loans; therefore, only a brief account of these lines will be given. They were constructed primarily to open for settlement tracts of outlying country, and have thus made possible the development of large areas of extremely fertile territory. The scheme of railway development mapped out by the Government is a thoroughly comprehensive one, and when fully carried out will bring western and southern Patagonia and similar remote sections of the Republic into rail communication with the capital and other important centers. The principal Government lines in operation or under construction are the Central Northern Railway, the North of Argentina Railway, the Formosa & Embarcacion Railway, the Patagonian Railways, and the Diamante-Curuzu Railway.

For years prior to 1915 deficits often resulted from the operation of the Government rail lines. In 1915 there was a substantial increase in gross receipts, as compared with 1914, and a very noticeable decrease in operating expenses. The receipts and expenses of the Central Northern Railway and the North of Argentina Railway for the two years mentioned were as follows:

Items.	1914	1915
	$m/n.	$m/n.
Gross receipts	13,164,079	14,844,658
Operating expenses	17,227,194	14,774,407
Net results	−4,063,115	+70,251

The Central Northern Railway (meter gauge) extends from Santa Fe, via Tucuman, Jujuy, and Negra Muerta to La Quiaca on the Bolivian frontier. Following the completion of a comparatively small mileage in Bolivia, this railway will form a very important section of a through route between Buenos Aires, Rosario, Santa Fe, etc., on the south, and Uyuni, Oruro, Potosi, Cochabamba, and La Paz, Bolivia, on the north, with connections to Lake Titicaca, Arica, and Peruvian points. Branches extend to Resistancia, Santiago del Estero, Salta, Embarcacion, etc., the Embarcacion division forming a direct through route to afford connections with means of access to the Bolivian Oriente, including Yacuyba and Santa Cruz de la Sierra (Bolivia). Connecting rail lines into this thinly settled territory will probably be constructed during the next few years. In the 4-year period 1911 to 1914, inclusive, approximately 950 kilometers (590 miles) of new line were completed and opened for traffic. Since the close of 1914, owing to war conditions, progress has been somewhat slower. The railway lines have been carried to considerable altitudes, the 12,000-foot mark being reached at Abra Tres Cruces.

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[a] Approximately correct.

[b] Information not available.

For the year ended June 30, 1917, the gross earnings of this State line amounted to $9,108,318 m/n, as compared with $8,167,788 m/n in 1915–16, $9,637,000 m/n in 1914, and $12,421,984 m/n in 1913.

The North of Argentina Railway (meter gauge) extends from near Santa Fe westward across the pampas to San Juan, at the foothills of the Andes. There are several important branches, including a line to Cordoba. Approximately 1,512 kilometers (940 miles) are operated. The operations of this line have usually resulted profitably.

The capital investment in the two lines just described amounts to $120,000,000 o/s.

The Formosa and Embarcacion line (meter gauge) will, when completed, be approximately 703 kilometers (437 miles) in length. This will exploit the vast and little-developed territories of Formosa and the Chaco. Approximately 300 kilometers (186 miles) of the line have been completed. Earnings, although not large, are steadily increasing.

The Diamante to Curuzu-Cuatia line (meter gauge) will, when completed, run from Diamante, on the River Parana, in the Province of Entre Rios, westward to Crespo, 34 kilometers (21 miles), where the Entre Rios line is joined and will be used to Hasenkamp. At Hasenkamp the Government continues operations on its own lines, which will extend northeasterly to Curuzu-Cuatia, on the Corrientes line of the Argentine North Eastern Railway. A rich and extensive territory is being opened up for development. Approximately 170 kilometers (106 miles) of the line have been completed.

The Patagonian State Railways (5½-foot gauge) will open to the world that vast territory. Plans call for the construction of about 2,000 kilometers (1,243 miles) of railway, of which approximately 900 kilometers (560 miles) have been opened for full or provisional traffic. The lines are handicapped through lack of rolling stock, despite which fact earnings are showing a steady increase. The lines, when fully completed, will be as follows:

(1) From Port Antonio, on the Gulf of San Matias, westward to Lake Nahuel Huapi, near the foothills of the Andes. The line may possibly be carried across the mountains to Chile to connect with the Chilean State Railways (also of 5-foot 6-inch gauge) at Osorno. The town of San Carlos de Bariloche, on Lake Nahuel Huapi, is to be the present western terminus. It is expected that this section of the Patagonian system will develop a fair traffic during the next few years. The line has been virtually completed, 448 kilometers (278 miles) being operated for passenger and freight service. Weekly passenger service is maintained.

(2) The Lake Nahuel Huapi to Puerto Deseado line. This, when completed, will extend from the western terminus of the Port Antonio-Lake Nahuel Huapi line southward to join the Comodoro

Rivadavia-Lake Buenos Aires line (see next paragraph), from which point it will follow the Deseado River in a general southeasterly direction to its mouth at Puerto Deseado, in the territory of Santa Cruz (46° S.). About 283 kilometers (176 miles), from Puerto Deseado to Colonia Las Heras, have been completed. Semiweekly passenger-train service is maintained in each direction.

(3) The Comodoro Rivadavia-Lake Buenos Aires Railway. This line terminates at the port of Comodoro Rivadavia, on the Gulf of St. George, from which point it will extend westward across Patagonia to Lake Buenos Aires. The line has been completed as far west as Colonia Sarmiento, 197 kilometers (122 miles). Weekly passenger-train service is maintained.

From January 1 to June 30, 1917, the combined earnings of the "State Development Railways," including the Patagonian lines and the Formosa to Embarcacion line, amounted to $832,221 m/n, as compared with $755,856 m/n in 1916.

It is expected that, once conditions in Argentina have returned to normal, the Government will continue its policy of railway expansion and development.[1]

PUBLIC UTILITIES.

The public-utility field has attracted considerable European capital to Argentina. According to the national industrial census of 1910, there were 56 power stations in the Republic, in which $48,737,877 m/n was invested. This number has since greatly increased, as will be indicated by the following statement, showing the number of cities and towns with power stations: Buenos Aires city, 1; Buenos Aires Province, 66; Entre Rios Province, 11; Santa Fe Province, 17; Corrientes Province, 8; Cordoba Province, 10; other Provinces and Territories, 19; total, 132.

This total includes a number of plants in the course of construction. Gas plants have been established in a few cities and towns; they are, however, not nearly so numerous as electric-lighting systems. No natural gas is obtainable in the country except in distant localities, and electricity has proved the favorite method of lighting throughout the Republic. Tramways have been built in most of the larger cities, there being 1,091 kilometers (678 miles) of main track in operation at the beginning of 1915.

ELECTRIC LIGHT AND POWER COMPANIES.

The most important electrical company in the River Plate countries is the German Transatlantic Electricity Co. (Compañía Alemana Transatlántica de Electricidad). The company was formed in Germany in 1898 with a capitalization of 6,000,000 marks. Work in Buenos Aires was soon begun and the enterprise developed rapidly. The company has a certain amount of competition, especially from the Italo-Argentine Electricity Co. (Compañía Italo-Argentina de Electricidad) in Buenos Aires. At the present time the capitalization of the German Transatlantic Electricity Co. consists of 110,000,000 marks bonds, 30,000,000 marks 5 per cent preferred stock, and 120,000,000 marks ordinary stock. Before the war dividends of 10 to 11 per cent per annum (10 per cent in 1914) were paid on the ordinary stock. The net profits of the Buenos Aires property for 1914 amounted to 23,327,423 marks. Other holdings of the company are as follows:

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[1] The total mileage of the Argentine State Railways in operation as of December 31, 1917, was 3,815, and the net working deficit at the close of the year was $1,724,619 m/n.

(*a*) Chilean Electric Tramway & Light Co., £650,000 preferred stock, £404,700 ordinary stock. This company, which operates in the city of Santiago, is capitalized at £650,000 preference shares and £500,000 ordinary shares. Part, at least, of the remaining shares are held in Great Britain. About 50 per cent in back dividends was due in January, 1918, on this preference stock, which is entitled to dividends of 6 per cent per annum, cumulative, in priority to dividends being paid on the ordinary shares. In addition to the shares, approximately £367,000 first mortgage debentures are outstanding.

(*b*) The entire stock of the Electric Tramways of Valparaiso, Chile, is owned, amounting to $5,000,000 Chilean gold ordinary stock.

(*c*) Transatlantic Electric Tramway Co., of Montevideo, Uruguay, $1.688,500 Uruguayan gold ordinary stock. This company operates one of the three tramway lines in the city of Montevideo.

(*d*) Argentine Electricity Co. (Cía. Argentina de Electricidad), Buenos Aires. $128,000 gold ordinary stock, $189,550 gold preferred stock. The total capitalization of this company, incorporated in 1909, is $388,600 o/s, of which $317,550 o/s is owned by the German Transatlantic Electricity Co., as indicated. The gross earnings for 1916 were $674,412 m/n and the expenses were $661,613 m/n.

(*e*) Light & Power Co. (Empresa Luz y Fuerza), Mendoza, Argentina, $835,000 o/s ordinary stock, $138,100 o/s bonds. This company furnishes light, power, and electric tramway service to the city of Mendoza. The total capitalization is $1,000,000 o/s ordinary stock and $138,100 o/s bonds. It is said that no dividends are paid. Approximately 19 kilometers (12 miles) of tramway lines are operated and about 6,000,000 passengers are carried annually.

Another important electrical company operating in Buenos Aires is the recently formed Italo-Argentine Electricity Co. (Compañía Italo-Argentina de Electricidad). During the year 1916 the company completed its principal power station and installed its system in important central sections of the city. On September 15, 1916, it entered into a contract with the National Government whereby electric energy is furnished to the port and customhouse of Buenos Aires. In spite of numerous delays arising from the difficulty of obtaining supplies on account of the European war, the company was able to complete its various concessions in time to receive a stipulated bonus of $200,000 m/n national bonds. The profits of the company for the year 1916, after deducting $271,677 m/n for writing off cost of installation, amounted to $246,651 m/n, most of which was either credited to reserve or carried forward. No dividends were paid, it being thought wise to conserve resources owing to the war. Power houses and other buildings owned by the company were carried on the balance sheet at $12,329,580 m/n, cables and installations at $8,726,385 m/n, and municipal public lighting installations at $517,090 m/n. The authorized and subscribed capitalization of this company is $5,000,000 m/n. Gross profits for 1917 totaled $498,623 m/n and the amount brought forward $320,628 m/n. Patrons number 23,000.

The Electric Co. (Compañía Electricidad) of Rosario is a Belgian concern, registered in the year 1910. Its capitalization is 35,000,000 francs and its head office is in Brussels. Few details are available concerning its operations.

Among other important companies in Argentina is the Anglo-Argentine Electricity Co. (Cía. Anglo-Argentina de Electricidad), incorporated in 1911, furnishing electric current to cities and towns throughout the Province of Buenos Aires, including certain suburbs of the capital. The authorized capitalization of the company is $10,000,000 m/n, of which $6,200,000 m/n is paid in. In 1911 and 1912 the company paid dividends of 8 per cent each, in 1913 9 per cent, and none since. The net profits for 1915 were $420,655 m/n. A recent quotation for the $100 m/n shares was $35 m/n per share. In 1913 the shares sold as high as 110.

An important company was incorporated in England in 1911 under the name of Cía. Electricidad de la Provincia de Buenos Aires, to take over a local company of the same name. The capitalization of the company consists of £1,000,000 ordinary stock (par £4), £300,000 7 per cent cumulative participating preference stock (par £1), and £879,300 5 per cent first-mortgage gold bonds. These bonds, which closed at 80 per cent on July 27, 1914, on the London Stock Exchange, were quoted at 60 in 1916. There were no sales in 1917. Dividends on the preference shares were suspended following the May, 1914, payment. This company furnishes light and power to a number of towns in the Province, including Mar del Plata, Quilmas, Junin, and San Luis. For the year ended July 31, 1917, gross revenues were £206,072 (£189,883 in 1915–16) and net profits £54,902 (£62,728 in 1915–16). No dividends were paid. The credit carried forward to 1917–18 was £1,258.

Descriptions of several additional electric lighting and power concerns will be found in the Appendix (see p. 483). In addition to these, other companies that might be mentioned are:

(*a*) The Electric Co. (Compañía Electricidad) of Corrientes, supplying the city of Corrientes. The capitalization of this company is $1,000,000 m/n, and the latest reported year's profits were $56,000 m/n.

(*b*) The San Carlos Electric Co. (Empresa Eléctrica San Carlos), at Bolivar, with a capitalization of $250,000 m/n.

(*c*) The Electric Light Co. (Alumbrado Eléctrico) at Rio Gallegos, Province of Santa Cruz. This is a new company, founded in 1915. The first year's operations resulted in a small profit.

Probably the most successful among the several British-controlled electric light and power companies in the interior of Argentina has been the River Plate Electricity Co., whose plant is located in La Plata. The capitalization of the company consists of £200,000 5 per cent debenture stock (par 100 per cent)—which sold at 105 per cent in pre-war days and in January, 1918, at 86 per cent—£125,000 6 per cent preference shares, and £150,000 ordinary shares. The ordinary shares (par 100 per cent) in 1912–13 sold at 262 per cent and at the closing of the London Stock Exchange July 29, 1914, were quoted at 240. In 1916 they reached the low figure of 120, and in January, 1918, sold at about 150. Dividends paid on this stock have usually been between 7 and 10 per cent, and a substantial balance has generally been earned and carried forward. Formerly the electric lighting plant in Tucuman was owned, but this was disposed of in 1914 to the Tucuman Light & Power Co. for the sum of £34,000 cash and £66,000 in debentures. The report of the River Plate Electricity Co. for the calendar year 1917 stated that the net revenues for the 12 months, after providing for the administration charges, amounted to £43,515, to which was added £15,142 carried forward. A dividend of 7 per cent was paid on the ordinary stock. Reserves, etc., on December 31, 1917, totaled £279,667. The company owns, in addition to its property and the Tucuman Light & Power bonds, a block of 5 per cent bonds of the Argentine Electricity Co. (controlled by the German Transatlantic Electricity Co.). No interest was received on these bonds in 1917, owing to the war.

GAS COMPANIES.

By far the most important of the none too numerous gas companies in Argentina is the Primitiva Gas Co., which furnishes the gas used publicly and privately in the city of Buenos Aires. This is a British-controlled company, its shares and debentures being quoted on the London Stock Exchange. In the days before the war the company was fairly profitable. Since that time, however, the increasing cost of fuel and supplies and the delay in collecting payments for public lighting have brought about a large decrease in net earnings. The approximate capital and scale of prices for the securities are as follows:

Securities.	Amount.	High price since 1911.	Price January, 1918.
Ordinary stock (par £5)	£1,450,000	8½	1⅞
Preference stock (par £5), 5 per cent cumulative	2,500,000	5⅝	3
4 per cent first debentures (par £100)	450,000	99	78
4 per cent Buenos Aires debentures (par £100)	225,000	99	53
4 per cent River Plate debentures (par £100)	315,000	99	62
4 per cent debenture stock of 1911 (par £100)	600,000	91½	59½
Total	5,540,000		

In the years 1911, 1912, and 1913 dividends of 8 per cent per annum were paid on the ordinary stock, in 1914 7 per cent, and none since. The preference shares received 5 per cent through 1915; in 1916 the dividend was omittted. The annual report for 1914 stated that, with £43,905 brought forward, the profit was £323,331. Owing to the financial crisis the net revenue decreased about £84,000. The results for 1915 showed a net profit of £85,500, and funds were drawn from reserves to meet the dividend on the preference shares. In 1916 a deficit of £25,500 resulted, and a fairly large floating debt has accumulated. The coal cost for 1916 averaged £3 4s. ($15.57) per ton, as compared with £1 14s. ($8.27) before the war. Gross receipts in 1916 were £77,021 less than in 1915. In 1917 net profits were £83,499; charges, £84,243; loss, £744. The 4 per cent first debentures are being paid off by money received from the German Transatlantic Electricity Co. in payment of purchase price for electric properties sold them in the year 1903. The amount paid to the Primitiva Gas Co. is £15,000 semiannually, to be applied to interest and sinking fund on the bond issue above mentioned. The payments expire in the year 1943. The gas mains of the Primitiva Gas Co. on December 31, 1917, totaled 1,138 miles in length, and the number of services was 201,435, as compared with 203,755 in 1914.

The South Barracas Gas & Coke Co. of Buenos Aires, and the Bahia Blanca Gas Co. are also British companies, their control and management being virtually the same. They are not large companies. The South Barracas Gas Co. is capitalized at £200,000 shares of a par value of £1. Before the war dividends averaged 4 to 5 per cent. Formerly the stock sold as high as £1 5s., but in January, 1918, it had fallen in price to 1s. 3d. per share. The securities of the Bahia Blanca Gas Co. have likewise fallen in price. The capitalization of the company consists of £150,000 ordinary "A" shares, par £5, and £70,000 ordinary "B" shares, par £1. The "A" shares have a priority over the "B" shares to the extent of 6 per cent, and after the "B" shares receive 6 per cent both issues share alike in further disbursements. The company, which was registered in 1907, paid dividends of from 2 to 3½ per cent on the "A" shares to 1911; in 1912 the dividend was passed, and thus far it has not been resumed. The "A" shares, which are listed on the London Stock Exchange, formerly sold as high as par (5). When the European war broke out they were selling at 2½; in 1916 they declined to 1, and recently they were quoted at ⅝. Loans, held by bankers, were outstanding to the amount of £40,000.

TRAMWAYS AND SUBWAYS.

Tramway development in the Argentine Republic during the past few years has been somewhat checked owing to the business depression of 1913 and the scarcity of investment capital on account of the European war. Nevertheless the larger cities of the nation are well provided with lines, which have occasioned high praise on the part of visitors to the country. The following table indicates the extent of the tramway mileage and the business handled in certain of the larger cities of the Republic:

Cities.	Miles of line.	Passengers carried.	
		1913	1914
Buenos Aires	493	423,661,657	387,789,519
Rosario	81	26,089,671	27,010,000
La Plata	29	6,781,546	6,113,676
Cordoba	27	7,950,580	6,580,000
Bahia Blanca	16	2,021,444	1,860,000
Corrientes	21	1,200,000	1,310,000
Mendoza	12	5,800,000	5,237,158

Returns of the tramway companies in Buenos Aires for the months of March, 1916 and 1917, show the following results, indicating business handled at the present time:

Items.	1916	1917
Length of line .... miles	497	486
Miles run	5,404,012	5,417,261
Passengers carried	30,311,747	30,699,455
Receipts .... $m/n	2,895,060	2,921,961

The receipts shown above were earned by the various tramway companies in operation as follows:

Companies.	1916	1917
	$m/n.	*$m/n*
Anglo-Argentine Tramways [a]	2,308,956	2,377,875
Lacroze Tramways (Ltd.) [b]	483,620	473,549
Electricos del Sud	34,663	34,363
Port and City of Buenos Aires Tramways	67,821	36,174
Total	2,895,060	2,921,961

[a] The actual mileage operated by this company was 385.8.

[b] The Lacroze Tramways (Ltd.) operated, as of June 30, 1917, 75 miles of tramway lines. Gross receipts for the year ended June 30, 1917, were $5,343,714 m/n, as compared with $5,653.223 m/n in 1915-16.

The Anglo-Argentine subway line (see p. 75) operates 14 kilometers (8.7 miles), and results for March, 1916 and 1917, were as follows:

Items.	1916	1917
Miles run	200,168	207,699
Passengers carried	2,414,775	2,404,045
Receipts $m/n.	241,477	240,404

Financial returns and other data concerning the Anglo-Argentine Tramways Co. will be found in the Appendix (p. 483). Results for 1916, which was not a good year, indicate that after including the £94,120 brought forward from 1915 and after deducting (1) £96,000 carried to depreciation renewals reserve, (2) £257,366 expended for maintenance, and (3) £840,716 for interest, sinking funds, and dividend of 5½ per cent on the first preference, there remained £50,961 to be carried forward. The appropriation for depreciation renewals reserve in 1915 amounted to £120,000, and maintenance in that year amounted to £265,963.

A comparison of the present and past prices of securities of the Anglo-Argentine Tramways Co. and the amount of securities outstanding are shown in the following table. All these securities, except the ordinary shares, are listed on the London Stock Exchange; the ordinary shares are listed in Buenos Aires:

Securities.	Amount outstanding.	Par value.	High price since 1911.	Price, January, 1918.
5½ per cent first preference shares	£3,200,000	£5	5½	2⅜
5½ per cent second preference shares (cumulative)	2,500,000	5	5⅜	2½
4 per cent redeemable debentures	4,352,000	100	97½	68
4½ per cent redeemable debenture stock	1,720,000	100	104	70
5 per cent redeemable debenture stock	6,000,000	100	105½	67
Ordinary stock	[a] 3,250,000	5	(a)	(a)

[a] The ordinary shares of this company are not quoted, the entire issue being held by the Compagnie Générale de Tramways de Buenos Aires, a holding company formed to amalgamate the tramway systems of the city.

The total capitalization, £21,022,000, does not include outstanding securities of leased lines.

The securities of the Buenos Aires Lacroze Tramways Co., second in importance among the tramway systems of the city, are as follows:

Securities	Amount outstanding.	Par value.	High price since 1911.	Price January, 1918.
Ordinary shares	£2,187,500	1s. 9d.	(b)	(b)
Sterling 5 per cent first mortgage debenture stock	598,000	£100	103	74
5 per cent extension mortgage debentures	386,000	100	100	75
5 per cent consolidated mortgage debentures	1,000,000	100	88½	67
Total	4,171,500			

[a] $1 m/n.

[b] Not quoted.

The Buenos Aires Lacroze Tramways Co. owns a substantial interest in the Buenos Aires Port & City Tramways Co. and the Buenos Aires City & Suburban Tramways (Ltd.). The Buenos Aires Lacroze Tramways Co. was incorporated in 1905, and its shares are held in Argentina.

The Buenos Aires Port & City Tramways Co. has outstanding the following securities:

Securities.	Amount outstanding.	High price since 1911.	Price July 27, 1914.
Ordinary shares	£239,508	([a])	([a])
Preference shares, 5 per cent cumulative	82,000	([a])	([a])
6 per cent first debenture stock	242,207	103	72
6 per cent extension first mortgage stock	332,700	([a])	([a])
Total	896,415	....	....

[a] Not quoted.

Interest on the bond issues went into default in 1914–15.

The Buenos Aires City & Suburban Tramways Co. is capitalized as follows:

Securities.	Amount outstanding.	Par value.
Ordinary shares	£115,000	£1
Preference shares	115,285	5
5 per cent first debenture bonds	[a]500,000	100
Total	730,285	....

[a] Mostly pledged.

The company holds a concession to build 45 miles of line in Buenos Aires and to Las Conchas. Only a part of the line has been completed. The Buenos Aires Lacroze Tramways Co. and the Buenos Aires Port & City Tramways Co. hold a controlling interest in the securities. None of the securities are publicly quoted.

The earliest street car line in Argentina was that constructed by the Buenos Aires Great Southern Railway in Buenos Aires. This line was built in the year 1858 and ran from Plaza Constitucion to Lima and Morena Streets, then a railway terminus. This line and another constructed a few months later were controlled by railway companies and served as feeders to carry passengers between the stations and important sections of the city. The first line of importance was constructed in 1868 by Federico Lacroze. It was 7½ kilometers (4.7 miles) in length, and at that time was known as the Tramway Central (now Buenos Aires Lacroze Tramways, Ltd.). In 1870, it is said that there were 30 kilometers (18.6 miles) of horse car line in the city, and this mileage was rapidly increased during the following 20 years by the granting of several additional franchises and the construction of lines in various sections of the city. In 1887 there were 110 miles of track, the lines carrying in that year 23,000,000 passengers.

In 1902 the Anglo-Argentine Tramways Co. began to operate its lines by electricity. This line, incorporated in 1870, had assumed the leading place among the various tramway systems in the city. In

1899 its horse car lines carried 28,665,541 passengers, which held the record until 1903, when its electric lines carried 35,470,461 passengers. The 1904 total was 45,076,077, and the 1905 total nearly 78,000,000. Since 1905 the company has absorbed a large number of its former competitors. Its record year was 1913, when it carried 342,140,422 passengers. During the same year the Lacroze lines carried 60,603,913 passengers. This latter company's lines were electrified in 1905 by J. G. White & Co.

The splendid system of subways of which Buenos Aires is so justly proud was begun in September, 1911. The first section of the line was opened in 1913. This line extends from the Plaza Mayo, in front of the Government buildings, for 14 kilometers (8.7 miles), double tracked, passing the House of Congress and the Buenos Aires Western Railway station. Work on the section from the Retiro Station (Central Argentine Railway) to the Plaza Constitucion Station (Buenos Aires Great Southern Railway) has been suspended until after the close of the war. This line will connect the last-mentioned station with the stations of the Central Argentine Railway, the Buenos Aires & Pacific Railway, and the Cordoba Central Railway, as well as the banking and central business sections of the city. On the line now in operation stations are provided every three or four squares. An excellent and rapid service is maintained.

There are, in addition to the various tramway and subway companies already discussed, two small independent traction lines, namely, the Electric Tramways of the South (Tramways Eléctricos del Sud) and the Buenos Aires to Quilmes Railway. These are local companies, all or most of the shares being held in Argentina. The capitalization of the former as of June 30, 1916, was $4,000,000 m/n, and the profits for the year 1915 were $110,657 m/n. This company was founded in 1905. The Buenos Aires to Quilmes Railway (founded in 1904) is capitalized at $200,000 o/s. A small surplus is usually earned.

Among the tramway companies operating in other cities of Argentina the following may be mentioned:

(1) The Light & Power Co. (Empresa Luz y Fuerza), of Mendoza, controlled by the German Transatlantic Electricity Co. Before the war this company paid substantial dividends.

(2) The Argentine Tramways & Power Co., which operates or is constructing about 20 miles of tramway lines in and adjacent to the city of Santa Fe, and also furnishes electric light and power for commercial purposes. This company is capitalized at the following figures: £239,250 ordinary shares, £200,000 6 per cent cumulative preference shares, and £184,500 debenture stock. During the year ended September 30, 1917, profits from operation were £13,959 (£12,256 in 1916 and total profits £12,142. The surplus after £2,000 reserve for renewal and after interest, etc., was £423. No dividends were paid.

Most of the other tramway lines operating in Argentina are considered in the Appendix (see p. 483). In common with the gas and electric lighting companies, the tramway lines have suffered through the lack of immigration, brought about by the war, through the general depression, and particularly on account of the abnormal price of fuel. There are many excellent public-utility properties in Argentina whose shares are selling at prices far below normal. The possibilities in this field, until immigrants again find their way to the country, are limited to the possible consolidation of various properties with the view of economy in operation. As has been clearly indicated, British and German capital has been most active in this field, although fair amounts of Belgian and Italian capital have been invested. The United States has not yet had any important part.

TELEPHONE INVESTMENTS.

The first company to undertake telephone development in Argentina was the Pan-Telefono Co., established in 1881. A competitor known as the Gower-Bell Telephone Co. was established the same year. In 1883 the Union Telephone Co. was formed and took over the earlier concerns. In 1886 the United River Plate Telephone Co. began operations, taking over the property of the Union Telephone Co. The "United" has continued uninterruptedly in the field since that date, although the Cooperativa Telefónica and other competitors have since been started. The United River Plate Telephone Co. has outstanding the following capital, all of which is listed on the London Stock Exchange and actively quoted:

Securities.	Amount outstanding.	Par value.	High price since 1911.	Price January, 1918.
Ordinary stock	£1,620,000	£5	8	6¼
Preference stock	200,000	5	5¾	4⅜
Debenture stock	300,000	100	105½	80
Total	2,120,000			

The ordinary stock has usually received 8 per cent per annum, which is the present dividend rate. The preference shares are entitled to 5 per cent per annum, cumulative, and the debenture stock to 4½ per cent. The "United" company's lines in Buenos Aires are operated by a subsidiary, the Compañía Unión Telefónica.

The Cooperativa Telefónica, which began business in 1887, has outstanding approximately $1,850,000 m/n shares, par $20 m/n. The company earned a profit of $249,935 in 1915, paying dividends of 6 per cent on the preference shares and 8 per cent on the ordinary shares. These are the usual dividend rates of the company.

Buenos Aires stands thirteenth among the larger cities of the world in the number of telephones installed per hundred inhabitants, its total per hundred inhabitants about equaling the totals of London and Paris.

That the telephone business in the interior of the country is good is indicated by the fact that the Compañía General de Teléfonos, operating the telephone lines in the city of Mendoza, usually pays dividends of from 10 to 15.4 per cent on its $500,000 m/n stock.

WATER SUPPLY AND SANITARY WORKS.

Prior to 1891 the water and drainage works of the city of Buenos Aires were operated by a private enterprise, the Empresa Arrendataria, a British company. On October 5, 1891, the British company was dissolved and the control and administration passed to the Argentine nation, the operations being carried on by an appointed board known as the Obras Sanitarias de la Nación (Sanitary Works of the Nation). Owing to the fact that a large portion of the city had been dependent upon wells for water supply and was without satisfactory drainage and sanitary facilities, it was decided greatly to extend the water and sanitary works of the city. Accordingly, in the year 1908 a comprehensive scheme was adopted which it was calculated would amply provide for the existing population and for future growth. In accordance with this plan, the city was divided into two districts—one comprising 7,413 acres, in which the water and drainage systems established prior to 1891 were to be supplemented, and a new district of 39,575 acres, for which a new sanitary system was to be laid out. The water is to be pumped from the River Plate at a point above the city to decanting reservoirs, filter beds, gravity and reserve tanks, from which will extend a network of water mains running to all parts of the city. A pumping capacity of 8,828,500 cubic feet daily, four water reservoirs 314 by 344 feet, and seven filter beds with an area of 519,901 square feet are being installed.

The drainage system called for the construction of a main sewer with branches serving the entire city. The outlet for this sewer is in the River Plate, about 16 miles below the city.

The system in 1908, prior to the commencement of the construction work on the extension, represented an outlay of $48,802,597 United States currency. The estimated cost of the extension was $71,821,233, of which practically $60,000,000 had been expended to December 31, 1916. The work may therefore be said to be nearing completion, notwithstanding the delays in procuring the necessary materials and supplies.

The revenue received by the National Sanitary Works from 1903 to 1916, inclusive, is estimated at more than $60,000,000. Totals have increased from $2,378,912 in 1916 to more than $7,000,000 per annum.

Under the supervision of the National Sanitary Works, work similar to that being carried on in Buenos Aires is under way in Mendoza, Catamarca, Mar del Plata, Corrientes, and Cordoba. These sanitary works will be maintained through the raising of special taxes.

It is interesting to record the amount expended and the revenue for service (supplying water and drainage facilities) in the various districts under the supervision of the board:

Districts.	Total to Dec. 31, 1916.	Revenues in 1914.	Lottery grant.	Administration and upkeep, 1914.
	$m/n	*$m/n*	*$m/n*	*$m/n*
Federal Capital	115,000,000	12,725,718	....	4,422,850
Catamarca	810,053	17,127	47,946	26,552
Cordoba	5,417,000	492,868	47,946	287,197
Corrientes	2,918,905	88,297	47,946	150,698
Jujuy	1,018,378	24,240	47,946	16,720
La Rioja y Chilecito	705,332	17,219	47,946	34,738
Mar del Plata	3,987,710	180,967	47,946	180,967
Mendoza	3,803,546	187,114	47,946	187,114
Parana	1,839,274	160,835	47,946	218,634
Salta	3,382,435	142,423	47,946	37,256
Tucuman	6,336,582	397,484	47,946	444,698
Santa Fe	3,542,232	263,955	47,946	214,977
Santiago del Estero	2,134,288	50,949	47,946	122,513
San Juan	1,183,369	67,823	47,946	55,004
San Luis	723,933	19,513	47,946	28,535

One of the most important of the privately owned waterworks is operated by the Province of Buenos Aires Waterworks Co., a British company that furnishes the necessary water supply for seven cities and towns located in the Province of Buenos Aires. The concessions covering three of the towns extend for 50 years; the remaining four cities and towns may purchase the waterworks at the end of 20 years (between 1930 and 1933) at a fair valuation, plus 20 per cent indemnity. The selling price will decrease each year after 20 years, until at the end of 40 years from the date of the original concession the works become the property of the various municipalities. The capitalization of this company is as follows:

Securities.	Dividend.	Amount outstanding.	Par value.	High price since 1911.	Price January, 1918.
Ordinary "A" shares	7 per cent noncumulative.	£450,000	£5	7½	4
Ordinary "B" shares		4,400	1s.	(a)	(a)
Preference shares	5 per cent cumulative.	150,000	£5	5 7/16	4¾

a Not quoted.

After dividends of 5 per cent per annum (cumulative) have been paid on the preference shares, the ordinary "A" shares are entitled to 7 per cent, the balance to be divided between the "A" and "B" shares. Dividends of 5 per cent each are being maintained on the preference and "A" shares. Rates on the latter class of shares have varied from 4 to 6 per cent per annum since the beginning of operations.[1]

A British company, the Consolidated Waterworks Co., furnishes the water supply for Rosario, which, as has been stated, is the second city in size and importance in the Republic. The city of Rosario may expropriate the undertaking at a price that would net, at 6 per cent per annum, an income equal to the net income for the year previous to such expropriation, plus an indemnity of 20 per cent. The company was registered in 1896, taking over the then existing properties and extending them. The company has been successful and has maintained a dividend rate of 8 per cent over a considerable period of years. Gross receipts of the company for 1916 totaled £129,472 and net receipts £69,656. Surplus after charges amounted to £32,306. Net receipts for 1917 amounted to £69,741.

The sewerage and drainage concessions for the city of Rosario are also held by British interests, the Rosario Drainage Co. (see Appendix, p. 495). The franchise expires in 1974. The company operates about 6,500 drainage connections. The company paid 3 per cent on its £369,200 ordinary stock during 1916, as compared with the maximum rate of 4 per cent. The stock was quoted in January, 1918, at 12s. per £1 share. Full dividends have been maintained on the 6 per cent cumulative preference shares (£120,000 outstanding). The company's two issues of debenture stock—£148,500 and £226,000 outstanding (first and second debenture stock)—are quoted at approximately 71 and 70, respectively, as compared with record high prices since 1911 of 87 and 84.

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[1] EDITOR'S NOTE.—Information received as this monograph was going to press shows that in 1917 profits totaled £16,663 and £5,495 was brought forward from 1916. The dividend on preference shares was 2½ per cent. The balance carried forward was £15,878.

The Bahia Blanca Water Co. (also British) has a concession to furnish water to Bahia Blanca and the near-by harbors of Ingeniero White and Punta Alta. This concession is for 99 years from October 16, 1918. The authorized capital stock of the company is £500,000 preference stock and £62,500 ordinary stock. The dividend rate is usually 4 per cent per annum.

MINING ENTERPRISES.

Argentina has done much to develop its considerable mineral resources. No taxes are levied on mines and minerals, and the discoverer has prior right over all other applicants for mining properties. It is stipulated, however, that all mines must be worked by at least four men and for a period of 230 days in the year.

Thus far tungsten, gold, copper, wolfram, borax, and petroleum have been the most important minerals developed. Very few mining companies have yet reached the stage wherein large profits are realized. Exports of minerals during the past 10 years have scarcely exceeded $3,000,000 o/s, despite the known mineral wealth of the Republic.

Gold is mined in small quantities throughout various sections of the Republic. Along the southern Patagonian coast, following heavy sea storms, a fair quantity of the yellow metal is gathered from among the sands. Alluvial digging has also been carried on in a moderate way since early colonial days. The total gold production from 1909 to 1913, inclusive, was estimated at $865,000 o/s. The Capillita gold mines, in the district of Catamarca, are among the most important. The Neuquen Proprietary gold mines in northern Patagonia are also of fair size. Their capitalization amounts to approximately $1,500,000 m/n, and the profits for 1915 were $121,233 m/n.

Copper mining has been developed to a fair extent, although most of the undertakings have been hampered by lack of working capital. A number of copper deposits exist in the Andean Ridges, many of them very difficult of access. There is every reason to believe that the industry has excellent future prospects. From time to time small amounts of the mineral have been exported to Europe.

Silver was formerly mined. The ore was generally of only moderate grade, and following the decline in the price of the metal the mines were abandoned. The recent rise in silver may lead to the reopening of the mines, which are located in La Rioja.

Sulphur has been found in Mendoza, and there are coal deposits in that Province, as well as in Neuquen and the Patagonian Territories. In the so-called Chos-Malal district of Patagonia several deposits have been located, including two or three of promise. One of the coal fields extends from the Neuquen River southward for 8 or 10 leagues, keeping near the Chacayo River. One seam of coal has been discovered, several feet in thickness, that extends for several miles.

The acute shortage of coal in Argentina has led to efforts to develop some of the Patagonian coal lands, and immediate steps are being taken to open up the Epuyen-district mines. These are located in the Territory of Chubut, about 300 kilometers (186 miles) from the Nahuel-Niyeu station on the Government's San Antonio Railway, and it is proposed to carry the coal on wagons to the railway.

Fifty men were recently sent to the mines to prepare for active development work. There are waterfalls in the territory near the mines, and these will probably be utilized for water power. The quality of coal in Argentina is certainly not of the highest, nor will transportation and production costs be low. Nevertheless, the shortage of the mineral will be partly relieved, and industrial companies, railways, and public-utility companies, as well as private consumers, will be benefited. Operations in a small way have been begun on a coal deposit in the Province of San Juan, about 400 tons of coal per month being produced. The railways are also experimenting to a certain extent with Mendoza coal, a small mine being worked near the station of La Hullera on the Buenos Aires & Pacific Railway.

During 1916 development in the tungsten-mining industry continued. This mineral is mined chiefly in the Province of San Luis, but also in San Juan and La Rioja. Prior to 1916 the best year's production was in 1909, when about 900 tons were mined, this representing about one-seventh of the world's production. The minimum production during the past 10 years in Argentina has been 325 tons.

PETROLEUM DEVELOPMENT.

As in most other South American countries, the problem of obtaining fuel became acute in Argentina with the progress of the war in Europe. That country had been accustomed to depend almost wholly on the United Kingdom for its coal, which was used for ships, railways, industries, and general fuel purposes. In 1913, out of 4,046,000 tons of coal imported, 3,977,000 tons came from the United Kingdom. When the war broke out and shipping was temporarily paralyzed the country had to fall back on stocks on hand, and even though shipments were later resumed they were necessarily in much reduced quantities. Although the United States supplied a part of the demand, Argentina in the last two years or so has experienced almost a coal famine, especially among the railways and other consumers in the interior. This has directed increased attention to the supply of fuel oil in the country and the possibility that it can be made a leading source of fuel for Argentine industries so that they can be made independent of foreign production and free from the danger of suspension which has faced them for the last three and a half years.

Petroleum production, although steadily increasing in the last ten years, is still far from reaching a point where it can thus satisfy national needs. In 1916 the highest yield up to that time was recorded, the output of the wells at the Comodoro Rivadavia field being about 820,000 barrels. This was 60 per cent greater than in 1915, when the output was 516,000 barrels. From 1907, when production began, to 1916 the output was as follows: 1907, 101 barrels; 1908, 11,472 barrels; 1909, 18,431 barrels; 1910, 20,753 barrels; 1911, 13,119 barrels; 1912, 47,007 barrels; 1913, 130,618 barrels; 1914, 275,500 barrels; 1915, 516,120 barrels; 1916, 820,000 barrels.

That this production, although steadily growing, has not served to satisfy national needs is shown by the large oil-import figures, amounting to 256,024 tons in 1915, 212,398 tons in 1916, and 222,610 tons in the first nine months of 1917. The Argentine oil runs about 6.8 barrels to the metric ton, but the imported oil, which is lighter, would go higher than this, so that the yearly imports may still be considered as approximately twice the production. Even with the rapidly advancing production, however, there is no reason to expect material decreases in importation in the near future, as the oil from the present producing regions can take the place of only certain grades of imported oil. It is also questionable whether under present conditions Argentine oil can be laid down in Buenos Aires at a price lower than that from Mexico and the United States.

Only one oil field in Argentina has as yet been exploited, but there are four regions in which oil deposits, more or less extensive, are known to occur. These are the Comodoro Rivadavia field, now being worked, located in the vicinity of the port of that name on the Atlantic coast about 850 miles south of Buenos Aires; the Salta-Jujuy field, in northwestern Argentina, in the provinces of those names; a district known as the Cacheuta field, a few miles south of Mendoza; and the Mendoza-Neuquen field, 600 to 800 miles southwest of Buenos Aires. Indications of oil in other regions are reported from time to time, and it is possible that extensive petroliferous areas are yet to be discovered, but there has as yet been no exploration of fields other than those mentioned. Except in the first-named field, indeed, little is definitely known about the possibilities of these four regions. They are estimated to cover altogether an area of several thousand square miles, but the "proved" area is less than 2 square miles.

DISCOVERY AND DEVELOPMENT OF SOUTHERN FIELD.

The Comodoro Rivadavia field has been producing oil only since 1907. In December of that year the General Board of Mines, Geology, and Hydrology of the Argentine Government was conducting geological investigations near Comodoro Rivadavia, in the course of which boring operations were being carried on, when oil was struck at a depth of 535 meters. A Government decree was immediately issued forbidding the recording or "denunciation" of claims within a certain radius of Comodoro Rivadavia, and exploration of the new field was begun by the board mentioned. Development proceeded slowly, however, and by the end of 1910 only seven wells had been sunk, four of which were for various reasons not producing. In November, 1910, a law was passed creating a reserved area for governmental exploitation covering 5,000 hectares (hectare = 2.47 acres), and in December an Executive decree placed oil operations in the charge of a special commission, the "Administrative Committee of the Comodoro Rivadavia Petroleum Fields." This commission has directed the exploitation of the reserved area since that date.

A comprehensive report of the commission, presented to the Minister of Agriculture in February, 1916, reviewed its achievements up to that time, showing that from the beginning of the working of the field 25 wells in all had been sunk, and 12 additional borings were in process at that time. The depth of the borings ranged from 526 to 565 meters, except in the case of one well, which had gone to 634 meters in search of new strata. Petroleum had been found in every well, and at the time the report was made the 21 wells in active production were giving about 14 tons per well per day. There were no gushers in this field. For storing this oil the commission had erected at Comodoro Rivadavia four steel tanks with a capacity of 6,000 cubic meters each, and had other storage space with a total capacity of about 26,000 cubic meters (a cubic meter of this oil is about 0.93 metric ton), while two steel tanks at Buenos Aires received the oil at that port. Two tank steamers, one owned outright and one chartered, were used to transport the oil, and two others were under construction in the United States.

The commission made an appeal for more funds with which to carry on exploitation work, asserting that development of the field had been greatly retarded because of insufficient appropriations by the Government. It proposed a Government bond issue of 15,000,000 pesos paper, and if these funds were granted it estimated that the production could be made to reach 480,000 tons in 1918 and 840,000 tons in 1920, thus providing a good percentage of the national needs. In order, however, to replace entirely the coal that had been imported in normal times, it was calculated that an annual output of some 2,500,000 tons would be necessary.

The desired 15,000,000 pesos was not authorized by Congress, but development along previous lines has proceeded since the above report was made, and the output has steadily increased. In July, 1917, there were 36 wells in operation and 19 more were being bored. The President of the Republic, in a message to Congress, estimated that production in 1918 would reach at least 200,000 tons. Two new storage tanks of a capacity of 6,000 cubic meters each and two others of 1,500 cubic meters were installed at Comodoro Rivadavia, and the two tank steamers mentioned above were delivered in the latter part of 1917. The weekly output, which in the first part of 1916 amounted to 1,600 to 2,000 cubic meters, by the latter part of 1917 had reached more than 4,000 cubic meters. A six weeks' strike of the workmen in the oil fields, beginning September 29, cut down the total of the year's output, but after this was settled production was resumed at the previous comparatively high rate. The policy of the Government with regard to increasing the output is one of conservation as well as exploitation, and while the desirability of intensifying production in order to provide national fuel and make the country independent of foreign sources of supply is recognized, the Government is guarding against the policy of working the fields to such an extent that a considerable exportation would result.

GOVERNMENT AND PRIVATE OPERATION.

The question as to what is the best method to follow in developing this admittedly promising field at Comodoro Rivadavia has caused much discussion and controversy. Government operation has been criticized as resulting in too slow a development, and plans have been brought forward which contemplate either a leasing of the field to private interests or a working of the field through a sort of partnership between the Government and private capital. The Government, however, has not heretofore looked with favor on the relinquishment of control of oil operations, and there is apparently no prospect that any change in the system of management will be made. One reason why Government control is considered necessary is that the oil may be used extensively in the future for the navy, and the oil reserve at Comodoro Rivadavia is looked on as a sort of fuel arsenal.

A few private companies have been operating outside of the reserved area. Among these may be mentioned the Compañía Argentina de Comodoro Rivadavia. The company has an authorized capitalization of $5,000,000 m/n, of which $3,000,000 m/n is outstanding. The company, in addition to its oil wells, tanks, and equipment, has constructed 7 kilometers (4.3 miles) of railway, which connects with the Government railway to the near-by port of Comodoro Rivadavia, as well as 3 kilometers (1.9 miles) of pipe lines. Natural gas and petroleum have both been found in good quantities, and the property, although still largely in its development stages, seems to be highly promising. Other companies in the field are the Compañía Nafta (Naphtha) de Comodoro Rivadavia, capitalized at $275,000 m/n; the Compañía Petroleo de Comodoro Rivadavia, capitalized at $1,077,000 m/n, etc.

QUALITY OF OIL.

As to quality, the Comodoro Rivadavia oil is heavy, with an asphalt base and a specific gravity ranging from 0.922 to 0.940, according to the United States Geological Survey, and on distillation yields 1.5 to 3.5 per cent of naphtha and gasoline, 15 to 19 per cent of illuminating oils, and 77 to 85 per cent of lubricants, fuel, and coke. This is heavier than the better grades of oil produced in the United States. The Argentine product has heretofore been used almost entirely as fuel, although the statement has been made that it will distill readily. It will doubtless find its chief usefulness as a fuel, to be used for combustion purposes as a substitute for coal. It is so used now by a number of Argentine factories, a few locomotives (although the railways for the most part are burning the hard quebracho wood now instead of coal), and some other fuel consumers. The "frigoríficos" in many cases use fuel oil, but this seems to be mostly if not entirely Mexican oil, imported by the Anglo-Mexican Oil Co., one of the two large private concerns that handle oil in Argentina. The other is the West India Oil Co., but this company imports oil from the United States for refining.

MARKED INCREASE OF PRICES—UNDEVELOPED FIELDS.

Prices of Argentine oil have naturally risen to high levels, in sympathy with the increases in prices of coal and costs of production and transportation. It has been the policy of the Government to offer the Comodoro Rivadavia product at little more than cost price, and in 1916 it was being supplied to factories at the rate of $24 paper ($10.17 United States currency) per metric ton. The commission, however, found it necessary to raise the price on March 1, 1916, to $40 paper, delivered to customers in their own containers at Buenos Aires, and since then it has mounted rapidly, reaching at successive steps $50, $60, $70, $85, and finally in December, 1917, $95 ($40.28 United States currency) per metric ton. As production has been increasing materially, the income from sales at these high prices has enabled the commission to proceed further with its development plans.

The oil in the other three fields besides the Comodoro Rivadavia is of somewhat different quality, having a paraffin instead of an asphalt base. The specific gravity of one sample of the Mendoza product was about the same as that of the coast oil, while the tests of Salta-Jujuy oil indicate a greater percentage of lighter constituents. It is asserted that samples from this district show a grade equal to that of Pennsylvania or Ohio, and one Government analysis gives 5 per cent of light oil, 30 per cent of kerosene, and 52 per cent of lubricating oil. It is very evident, however, that further explorations will have to be made in all these fields before the quality of the mineral, extent of deposits, and value to the industries of the country can be even approximately determined. Such exploration must await better transportation facilities, one big handicap to boring operations heretofore having been lack of water and supplies in the oil districts and difficulty of getting these necessities into these districts and the oil out.

[The foregoing data, compiled for the most part in the Latin American Division of the Bureau of Foreign and Domestic Commerce, were taken from a number of different sources, to which readers are further referred. The files of the Review of the River Plate, published in Buenos Aires, contain numerous notes and reports on the petroleum industry, and developments are followed rather closely each week. A résumé of information regarding all Argentine fields by Frederick G. Clapp appeared in the Bulletin of the American Institute of Mining Engineers for October, 1917. The United States Geological Survey, in its annual reviews of the petroleum industry of the world, includes accounts of Argentine production, the latest separate report now available being that for 1915. Two good accounts of oil production in Argentina have appeared in Commerce Reports, being translations of articles in La Nación, Buenos Aires. These are to be found in the issues for June 2, 1917, and May 27, 1915 (correction of figures of production in issue of October 1, 1915).]

UTILIZATION OF FOREST RESOURCES.

The forest areas of Argentina are proving sources of considerable national wealth. In the northern and northwestern Provinces development work is steadily being carried out and large returns are being realized by the various companies interested in the industry. The principal forest resources of the Republic are in the Provinces of Santa Fe, Santiago del Estero, Cordoba, and Tucuman, and in the Territory of the Chaco. In western and southern Patagonia rich timberlands also exist, covering relatively large areas.

THE QUEBRACHO INDUSTRY.

As is the case in the Republic of Paraguay (see p. 313), the quebracho (break-ax) is by far the most valuable tree found. This tree, which exists in the more northerly Provinces and Territories only, grows in two varieties, red and white, takes 90 to 100 years to come to full maturity, and reaches a height of 80 feet and a diameter of about 2½ feet. The logs of the quebracho are annually exported in considerable quantities for the extraction of tannin, while an increasing quantity of the tannin itself is being extracted locally and likewise shipped abroad. An extensive local market has been found for the quebracho. For some years it has been extensively used by the railways for sleepers. At the present time, although little railway construction is going on in the Republic, large amounts of the wood are used in the locomotives as fuel, owing to the acute shortage of coal, and a substantial amount is used for a similar purpose by manufacturing concerns.

In former years Great Britain was the principal purchaser of the quebracho extract or tannin, but since the outbreak of the war the United States has gradually come to take the largest quantity. In June, 1917, the United States purchased 3,821,220 kilos (8,424,380 pounds), Great Britain 2,623,130 kilos (5,782,966 pounds), France 2,569,000 kilos (5,663,630 pounds), Norway 1,100,000 kilos (2,425,062 pounds), Italy 1,026,353 kilos (2,262,698 pounds), and Spain 20,000 kilos (44,092 pounds).

Exports of quebracho and quebracho extract during recent years have been as follows:

Years.	Quebracho extract.		Quebracho logs.	
	Tons.	Value.	Tons.	Value.
		$o/s		*$o/s*
1901	4,310	431,000	198,920	1,989,200
1906	30,839	2,162,950	230,100	3,425,101
1911	68,431	4,980,027	438,219	6,897,435
1912	74,910	4,836,860	279,342	3,568,557
1913	79,684	4,974,687	383,964	4,988,349
1914	80,153	5,186,946	291,942	3,777,121
1915	100,213	15,873,372	209,679	2,684,408

Probably the largest concern interested in the quebracho industry is the British-controlled Forestal Land, Timber & Railways Co. This company is capitalized at the following figures:

Securities.	Amount outstanding.	Par value.	High price since 1911.	Price January, 1918.
Ordinary stock	£1,545,849	£1.	3$\frac{9}{32}$	2½
Preference stock (6 per cent)	1,545,850	1	2¼	1⅝
5 per cent first mortgage refunding bonds	1,158,700	100	105	103
5 per cent mortgage debentures of 1914	1,172,100	100	104¼	104
Total	5,422,499			

The company's balance sheet as of December 31, 1916, stated that general reserves amounted to £772,925 and special reserve to £450,000. The depreciation fund amounted to £773,212. A total of £800,000 has been set aside for war-profit tax and other contingencies. The amount carried forward to the credit of preference shares as of December 31, 1916, was £46,061, and to the credit of ordinary shares £138,162.[1] The preference shares are entitled to cumulative dividends of 6 per cent per annum and to 25 per cent of remaining profits. The ordinary shares are entitled to the balance. The average dividend paid during the 11 years to and including 1916 has been 11½ per cent on the preference shares and 16½ per cent on the ordinary shares. The rates for 1915 and 1916 on the two classes of stock were 12 per cent and 15 per cent on the preference and 18 per cent and 27 per cent on the ordinary shares. During the 11-year period previously mentioned the item of "good will," which stood at £405,000, was written off, and large capital expenditures were made. Net profits for the year 1916 amounted to £1,614,898, as compared with £900,947 in 1915. The excess-profit tax for the year amounted to £600,000.

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[1] In 1917 the profits after depreciation, charges, etc., totaled £822,395, which was appropriated as follows: Reserve for excess profits, etc., £200,000; special reserve account, £150,000; preference shares dividend (12 per cent), £187,661; balance, £284,733. The dividend on the ordinary shares was 18 per cent.

In addition to its forest areas, the Forestal Co. owns large cattle ranches, about 300 leagues of cleared land lying unused, and a considerable mileage of light railways. The total area of all properties, including about 650,000 acres leased, is about 5,500,000 acres. All the stock of the Puerto Ocampo Railway, the Compañía Argentina de Lanchas, and the New York Quebracho Extract Co., of New York City, is owned, as well as about £129,200 of the £355,920 shares of the Development Co. of Santa Fe (see Appendix, p. 491). The company guarantees the interest on the bonds of the Quebrachales Fusionados, which are outstanding to the approximate amount of £100,000.

The Sociedad Anónima Quebrachales Fusionados, while interested primarily in Paraguay, has nevertheless large properties in the Chaco and elsewhere in Argentina. The company was incorporated under the laws of Argentina in 1906. The capital stock amounts to $1,750,000 m/n, having been reduced from $7,000,000 m/n in 1913, in which year the par value of the shares was reduced from $100 m/n to $25 m/n. The total acreage of lands owned is approximately 650,000. The properties of the company are carried on its books at a valuation of $12,674,835 m/n, of which $4,237,489 m/n represents the valuation of the Argentine property, located at Puerto Tirol. At the close of 1916 about 108 leagues of land in the two Republics were covered with quebracho trees and three industrial establishments (which are practically townships) were owned, these establishments having a total producing capacity of 18,000 tons. The company owned and operated 121 kilometers (75 miles) of railway equipped with 9 locomotives and 306 cars. Its property also included 234 carts and 2,868 oxen.

The profits for 1917 totaled $1,614,279 m/n; after amortization, etc., $1,452,829 m/n. A dividend of $10 m/n (40 per cent) was declared. The sum of $607,546 m/n was appropriated to reserve and provision funds. Formerly the dividend payments were only nominal; before the war they rarely exceeded 2 per cent per annum. The $25 m/n shares were quoted on the Buenos Aires Stock Exchange in September, 1917, at $67 m/n per share and prior to selling ex-dividend early in 1917 were quoted at $82 m/n, as compared with an average price of $10 m/n to $11 m/n in 1914. The entire output of the company for the year 1917 was disposed of at very high prices. An increase in capital to $5,250,000 m/n is contemplated, new shares to be distributed among present shareholders.

Other companies interested in the industry have benefited greatly through present demands and high prices. The shares of the River Plate Quebracho Co., which has a capitalization of $600,000 o/s and which has not paid dividends for a number of years, have risen in price from $0.45 o/s per $1 o/s share to the September, 1917, quotation of $1.05 o/s, and operations are beginning to show substantial profits.

OTHER FOREST ACTIVITIES—STATISTICS OF INDUSTRY.

Other branches of the forestal industry have developed substantially during recent years. Yerba mate or Paraguayan tea is gathered in the northern forests in large quantities, there being a large market for the tea throughout the River Plate Republics. There is also a general demand for various kinds of woods for cabinet-making, building purposes, fence posts, firewood, etc. According to the industrial census of 1910, there were in that year 283 aserraderos or sawmills, with a total capital of $16,808,728 m/n and annual sales of $36,153,831 m/n; nine quebracho factories with capital of $8,248,013 m/n and annual sales of $9,472,868 m/n; 100 forestal exploitation and development companies with capital of $17,273,637 m/n and yearly sales of $12,286,260 m/n. These figures are probably considerably below the present status of the industry. The annual value of forest products exported since 1909 has varied between $8,927,362 o/s and $12,254,605 o/s. Recently interest developed in a project to exploit certain Patagonian forest areas for the production of pulp for paper making. Tests that have been made prove that a ton of pulp might be produced from 3½ trees.

To protect its forestal areas the Government has appointed inspectors and technical experts and has passed laws for conservation.

PASTORAL AND AGRICULTURAL DEVELOPMENT.

It is in the pastoral and agricultural areas of Argentina that its greatest source of wealth lies. The splendid character of the nation's farms and the extent of the cattle and sheep ranches have won world-wide praise. The richness of the cereal lands has been the principal cause of the great influx of settlers who have brought about the rapid development of the Republic. It is to the "camp"—the vast stretches of farming country—that Buenos Aires, Rosario, and the other large cities owe their existence. Agricultural and stock-raising activities have been responsible for the splendid network of railways of which the nation is so justly proud. The vast increase in land values that has followed the growth of the country has created numerous great fortunes for those who bought when prices were low and who successfully managed their properties.

STATISTICS OF LIVE STOCK.

The number of domestic animals as reported in the live-stock census of 1908 and the estimated total in the year 1915 were as follows:

Live stock.	1908	1915	Live stock.	1908	1915
Cattle	29,116,125	29,500,000	Sheep	67,211,754	80,000,000
Horses	7,531,376	9,700,000	Asses	285,088	340,000
Mules	465,037	580,000	Pigs	....	3,050,000
Goats	3,245,086	4,520,000			

In the year 1857 cattle formed 25 per cent of the wealth of the nation. In 1864 there were 10,215,000 cattle; 20 years later there were 14,171,000; in 1894 the total was 21,701,526. In the last-named year horses totaled 4,446,859, and the value of all live stock in the Republic was estimated at $200,600,000 o/s. In 1908 the estimated value was $413,021,767 o/s, and in 1915 $782,000,000 o/s was given as the total figure. At present prices the live stock of Argentina would probably realize $1,000,000,000 o/s.

Cattle and sheep are raised practically all over the pampas and in the north and south of the country. The industry in Patagonia is practically confined to sheep raising. Although there still are areas that have not been taken up for stock-raising purposes, the possibility of any considerable increase in the number of animals raised lies in the improvement of existing pasture lands through the cultivation of lucerne and other pasturage. During recent years the stock has been greatly improved through the importation of valuable bulls, rams, and other animals. During the period 1901 to 1914, inclusive, a large number of pedigreed animals were imported, including 12,761 cattle, 34,597 sheep, 5,558 horses, 3,488 pigs, etc.

In the year 1830 there were approximately 3,000,000 sheep in Argentina, and the amount of wool exported was 6,000,000 pounds. In the eighties the number of sheep was approximately equal to the present total, and since that period the industry has not retained its relative importance. Great areas of Patagonian lands will probably always remain pasture land, although it is likely that in time the number of sheep will show a decrease, following the extension of irrigation after the war.

BRITISH COMPANIES IN THE FIELD.

The pastoral industry in Argentina has naturally attracted considerable amounts of foreign capital. A number of pastoral companies have been formed, backed by British and German capital. Among the British companies in the field mention may be made of the following (these include agricultural development companies):

Companies.	Capital.	Companies.	Capital.
Argentine Estates of Bovril (Ltd.) [a]	£1,268,914	Leach's Argentine Estates [b]	£1,800,000
Argentine Southern Land Co	280,000	Port Madryn Land Co	125,000
Argentine Land & Investment Co	740,000	Rio Negro Land Co	300,000
Argentine Northern Land Co	329,487	River Plate Land & Farming Co. [c]	40,000
Cordoba Land Co	1,537,382	South American Cattle Farms (Ltd.) [d]	765,480
Development Co. of Santa Fe	355,920	Tekla Land Co	200,000
Guatrache Land Co	405,512		

[a] Also operates meat-extracting factories.
[b] Operates in Argentina and Uruguay.
[c] Also operates sugar plantations.
[d] 10 estancias in Argentina and 9 in Paraguay.

A number of the companies listed above are described more fully in the Appendix. Nearly all of the companies are on a dividend basis, and their shares are generally considered sound investments.

British investments in land, cattle, sheep, and farming companies probably amount to about $50,000,000 United States currency. Belgium has about $3,500,000 similarly invested.

A complete list of German estancias and ranches is not available.

INVESTMENT OF ARGENTINIAN CAPITAL.

The extent to which local Argentinian capital is invested in land, cattle, and farming enterprises is indicated by the following table of large public companies:

Companies.	Capitalization.			Profit or loss, 1914–15.[a]
	$o/s.	$m/n.	£ sterling.	
Argentina Hidraulico-Agricola		2,000,000		—$78,888m/n
Brucklay Estancia Co. (British)			34,000	£3,199
Caapucu	100,000			
Consuelo Estancia Co		500,000		$68,727m/n
El Albardon		5,980,000		—$3,881m/n
El Nuevo y Medio	800,000			
El Sosneado		4,050,000		
Estancia Buena Vista		215,000		$13,493m/n
Estancias Cochiquingan (Ltda.)	90,000			$11,837o/s
Estancias y Colonias Trenel		6,000,000		$1,039,330m/n
Entancias y Colonias Walker		2,000,000		$272,619m/n
Estancia Juan Duggan (Ltda.)		2,500,000		$768,106m/n
Estancia La Pelada	600,000			
Estancias O'Farrell (Ltda.)		2,000,000		$177,418m/n
Estancia La Madrugada (British)		343,635		$1,484m/n
Estancia Pulmari (Ltda.)		470,000		$2,500m/n
Fuerta Olimpo	440,000			$56,861o/s
Ganadería Mate Grande (Ltda.)		600,000		$119,216m/n
Granja Blanca (wholesale milk business)		1,000,000		
Samuel B. Hale Co. (Ltd.)	5,040,000			$728,168o/s
Haras Pelayo		340,000		$23,867m/n
Hill Station		300,000		$4,587m/n
La Belgica	(b)	(b)	(b)	$29,879m/n
La Estanciera	1,301,400			$34,232o/s
La Marianita	800,000			$91,203o/s
La Martona	2,005,200			$80,541o/s
La Peninsula		183,000		$24,338m/n
La Peregrina		800,000		$57,838m/n
La Salamanca		375,000		
La Tandiliera		5,000,000		
La Unión Argentina		573,300		
La Cabezas Estancia Co. (British)			196,582	
Las Vegas		1,070,000		$300,272m/n
Los Palmaras		1,323,500		—$103,088m/n
Mulak Aike Sheep Farm		250,000		$185,534m/n
Estancia Padernales	500,000			—$149,803o/s
Productos Kemmerich	(c)	(c)	(c)	(c)
San Juan Estancia Co. (British)			75,000	$11,930m/n
San Guillermos Co. (Ltda.)			32,750	£3,963
Tierras y Dominios La Patagonia	240,000			$103,914o/s
Helvetia Land Co. (Anglo-Swiss)			50,000	£13,100
Monte Dinero Sheep Farming Co. (British)			24,000	$110,842m/n
River Plate Dairy Co	500,000			$141,000o/s
Scottish Estancia Co. (British)	186,000			
Tubantia Co. (Netherlands)	(d)	(d)	(d)	$10,824m/n
Unión Pastoril	(e)	(e)	(e)	
Vicente Pelluffo & Co		2,720,000		$503,912m/n

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[a] Losses are indicated by minus signs.

[b] This is a Belgian company capitalized at 1,250,000 francs.

[c] The head office of this company is in Antwerp, Belgium. The paid-in capital is 14,000,000 francs, and the profits earned for the year were 1,204,097 francs.

[d] The shares of this company (amount not stated) are held in the Netherlands.

[e] Operates the estancias La Puma, Rincon, and Los Valles; head office in Antwerp, Belgium; capitalization 3,000,000 francs.

The statements of profits in the above table are those of a year in which earnings were generally a good deal below normal, and from such returns as are available it seems likely that the 1916 results showed a considerable increase.

EXPORTATION OF PASTORAL PRODUCTS.

Exports of animals are now largely confined to horses and mules for use in the war. A small number of cattle and sheep are sent across the mountains to Chile and Bolivia, and a somewhat larger number to Uruguay. Brazil and Paraguay also, from time to time. are purchasers of live stock from Argentina. Exports of this kind for 1913, a normal year, amounted to more than $9,000,000 o/s.

Estimates compiled by the Government a few years ago indicated that the Provinces of Corrientes, Buenos Aires, and Santa Fe contain normally the largest number of cattle, while the Provinces of San Luis, Entre Rios, Buenos Aires, Corrientes, and the Territories of Pampa, Rio Negro, Neuquen, Santa Cruz, Chubut, and Tierra del Fuego contain most of the sheep.

The shortage of wool in the world's markets has caused an unprecedented demand for the Argentine product. Exports of wool for the fiscal year ended September 30, 1917, were 349,622 bales, as compared with 299,207 bales in 1915–16, 304,517 bales in 1914–15, and 305,606 bales in 1913–14. The United States purchased nearly two-thirds of the supply in 1916–17. Sheepskins were exported during the first seven months of 1917 to the amount of 29,081 bales, as compared with 19,226 bales for a similar period in 1916 and with 34,807 bales for the year 1916, 44,445 bales for the year 1915, 29,602 bales for the year 1914, and 41,541 bales for the year 1913.

Consul General W. Henry Robertson, stationed at Buenos Aires, reports, under date of March 18, 1918, that notwithstanding the world's scarcity of tonnage the exportation of Argentine meat has not suffered, as is evident from statistics recently published. In a report on the development of the country's meat exports from the year 1910, prepared by the Director General of National Statistics and published in the Review of the River Plate, it is shown that the shipments of meat have increased from 362,385 tons for 1910 to 559,216 tons for 1917. The total quantity exported for each year since 1910 and its total value in Argentine gold pesos of $0.965 each were as follows:

Year.	Tons.	Gold pesos.	Year.	Tons.	Gold pesos.
1910	362,385	48,431,939	1914	459,853	91,009,752
1911	441,564	60,931,362	1915	442,546	97,623,275
1912	455,842	65,000,465	1916	544,748	129,277,603
1913	443,086	76,373,504	1917	559,216	137,085,392

Canned meat is an item of daily increasing export. In the years 1910 to 1914 it fluctuated between 13,000 and 16,000 tons per annum, rising in 1915 to 32,514 tons, and attaining in 1916 to 45,196 tons. In 1917 the 1916 figure was more than doubled, the amount being 102,153 tons.

The following table shows in detail the quantity and the value (in gold pesos) of each of the products exported from 1910 to 1917 which make up the classification of "meat in general":

Meat	1910		1911		1912		1913	
	Tons	Gold pesos.	Tons.	Gold pesos.	Tons.	Gold pesos.	Tons.	Gold pesos.
Frozen beef	245,267	34,337,380	297,738	41,981,058	317,620	46,372,520	332,054	59,105,612
Chilled beef	8,441	1,181,740	15,096	2,128,536	25,231	3,683,726	34,175	6,083,150
Frozen mutton	75,102	8,786,934	85,916	10,224,004	70,175	8,631,525	45,928	6,931,056
Frozen pigs	1	151	....	....	....	....	....	....
Jerked meat	9,442	1,033,020	12,120	1,661,615	8,824	1,400,748	3,910	658,097
Canned meat	13,030	2,260,078	16,127	3,834,879	18,331	3,604,218	13,014	2,285,158
Frozen offal	11,102	832,636	14,567	1,101,270	15,661	1,307,728	14,005	1,260,431
Total	362,385	48,431,939	441,564	60,931,362	455,842	65,000,465	443,086	76,373,504

Meat.	1914		1915		1916		1917	
	Tons.	Gold pesos.	Tons.	Gold pesos.	Tons.	Gold pesos.	Tons.	Gold pesos.
Frozen beef	328,278	66,640,434	351,036	75,823,776	411,547	94,079,710	355,842	77,315,569
Chilled beef	40,690	8,260.070	11,703	2,527,848	16,153	3,692,578	38,995	8,940,426
Frozen mutton	58,688	9,918,272	35,035	6,341,335	51,317	9,929,945	39,820	7,834,100
Frozen pigs	334	33,379	887	88,656	1,345	268,974	764	169,568
Jerked meat	2,383	570,796	213	50,941	1,120	268,059	7,613	2,108,253
Canned meat	13,590	3,830,956	32,514	11,373,638	45,197	18,748,916	102,153	37,637,011
Frozen offal	15,890	1,755,845	11,158	1,417,081	18,069	2,289,421	14,029	3,080,465
Total	459,853	91,009,752	442,546	97,623,275	544,748	129,277,603	559,216	137,085,392

THE DAIRY INDUSTRY.

The dairy industry is beginning to attain substantial importance, and during recent months the Republic has been exporting large quantities of butter and cheese to Europe. A recent estimate placed the number of dairies in the country at 1,259, producing milk and its products to the value of $19,000,000 m/n. The present figure is probably about $25,000,000 m/n. There is certainly room in Argentina for development in this industry along the scientific lines followed by large American companies, and there is a possibility that American capital thus invested would yield a very substantial return. At present the chief difficulty is the scarcity of labor. Among the various milk products that are successfully marketed is casein. The Compañía Nacional de Caseina, capitalized at $350,000 m/n, is the leading manufacturer in the field. Net profits for 1915 were $72,843, and substantial dividends were paid. The total production of casein for the year 1912 was 5,257,207 kilos (11,590,144 pounds).

CEREAL CROPS.

The agricultural industry has already been treated in a general way. However, a few necessary statistics will here be shown, indicating acreage, annual production and exports, etc. It is only through an appreciation of these figures that the extent of agricultural development in Argentina may be realized.

The area under principal grain crops (in acres) has been as follows:

Grains.	1900–1901	1913–14	1914–15	1915–16	1916–17
	Acres.	*Acres.*	*Acres.*	*Acres.*	*Acres.*
Wheat	8,352,000	16,243,500	15,471,000	16,420,000	16,089,000
Linseed	1,501,000	4,257,500	4,262,500	4,000,500	3,207,500
Maize	2,493,500	10,260,000	10,386,000	9,928,500	8,969,000
Oats	80,500	2,869,000	2,821,500	2,565,000	2,525,500

The tonnage of grains exported during 1915 and 1916 was as follows:

Grains.	1915	1916
	Tons.	*Tons.*
Wheat	2,448.724	2,273,205
Linseed	1,001,542	638,654
Maize	4,349,951	2,864,209
Oats	591,212	784 734
Barley	75 946	53,032

The record production of various grains was in 1913. During that year the production in tons amounted to the following (the years 1893 and 1903 are shown for purposes of comparison):

Grains.	1893	1903	1913
	Tons.	*Tons.*	*Tons.*
Wheat	1,593,000	2,823,853	5,100,000
Linseed		711,353	1,130,000
Oats		57,000	1,682,000
Maize	[a] 2,240,000	3,783,450	[b] 4,995,000

[a] Year 1895; figures for 1893 not available.
[b] As compared with 7,515,000 tons in 1912, 6,684,000 tons in 1914, and 8,600,000 tons in 1915.

The average wheat and linseed yield (bushels per acre) has been as follows:

Provinces.	Wheat.		Linseed.	
	1912	1913	1912	1913
	Bushels per acre.	*Bushels per acre.*	*Bushels per acre.*	*Bushels per acre.*
Buenos Aires	9.1	10.7	2.4	11.4
Cordoba	11.0	12.5	8.7	9.2
Entre Rios	10.5	10.9	8.4	10.6
Pampa	10.0	11.4	9.8	8.5
Santa Fe	7.8	11.4	4.9	10.4

During 1915 there were 395,000 acres under barley and 92,600 acres under rye.

The so-called cereal zone of Argentina comprises the Provinces of Buenos Aires, Cordoba, Entre Rios, Santa Fe, a section of San Luis, and practically all of the Pampa Central Territory—covering in all about 200,000,000 acres. The soil of this district is famous for its fertility, the climate is good, and the rainfall is usually sufficient. There is no snow, and water is generally obtainable either from brooks or ponds or at a slight depth. The country is absolutely level and not unpleasing to the eye. Living conditions in the estancias are pleasant in the extreme, and the life of an agriculturist in Argentina has many advantages and charms not existing elsewhere. The railway systems that traverse the cereal zone, in every direction, form a ready means of communication with the various ports. Practically all of the agricultural zone, in fact, is within less than 500 miles of the shipping ports, the most important of which are Buenos Aires, Bahia Blanca, La Plata, and Rosario.

The Government, through its Mortgage Bank, and in other ways, is lending considerable aid to agricultural development; the small proprietor is being assisted, and seeds and herbs are admitted free of duty, as are also certain classes of agricultural machinery. After the close of the war, the agricultural activity of Argentina will recover from its temporary check, and the Republic will rise to an even higher place among the world's great nations.

THE SUGAR INDUSTRY.

Sugar was produced in Argentina at as early a date as 1750. However, it was not until between 1835 and 1840 that any real development began. In the latter year the first sugar mill was erected, its location being in the Province of Tucuman. In 1880 improved sugar machinery was brought into use, and in 1884 the production had risen to 55,000 tons. During recent years the production has been as follows: In 1906, 116,287 tons; in 1907, 109,445 tons; in 1908, 161,662 tons; in 1909, 127,882 tons; in 1910, 148,509 tons; in 1911, 180,092 tons; in 1912, 147,299 tons; in 1913, 276,140 tons; in 1914, 335,955 tons; in 1915, 149,299 tons; in 1916, 84,069 tons; and in 1917, 88,076 tons.

The 276,140 tons of sugar produced during 1913 were the result of the working of 38 mills—27 in the Province of Tucuman, 3 in Jujuy, 3 in the Chaco Territory, 2 in Santa Fe, and 1 each in Salta, Corrientes, and Formosa. The total amount of cane handled during the year was 3,131,018 tons, of which 2,611,114 tons were handled by the mills in Tucuman, 399,790 in Jujuy, 65,157 in the Chaco, 27,008 in Santa Fe, 19,026 in Salta, 7,108 in Corrientes, and 982 in Formosa. The average yield for the year was 8.8 per cent, the best results being obtained in Jujuy, where the average was 9.4 per cent. The yield in Tucuman was 8.8 per cent. Approximately 85 per cent of the 250,000 acres under sugar cultivation are located in Tucuman, 9 per cent in Jujuy, and the remainder is scattered. Formerly Santiago del Estero stood second to Tucuman in sugar production; to-day, however, its production is insignificant. The sugar planters of Argentina have been extremely unfortunate in not being able to obtain normal crops since the outbreak of the war and the rise in prices.

A considerable amount of local capital is interested in sugar mills and in plantations, in addition to several foreign companies, the most important of which is the British-controlled Leach's Argentine Estates, which has a substantial dividend record and of which mention is made elsewhere. The output of this company for 1914–15 amounted to 26,461 tons of sugar. About $10,000,000 United States currency is invested in the enterprise.

Among the various local companies interested in the industry is the Sociedad Anónima Azucarera Argentina. Its capitalization consists of $1,000,000 o/s 7 per cent debentures and $1,500,000 o/s shares. Dividends for a number of years have averaged 15 per cent, although, since the war, they have fallen off somewhat—10 per cent for 1915. Profits for the year 1916 amounted to $322,939 m/n, as compared with $442,085 m/n in 1914. The September, 1917, quotation for the company's shares was 130 per cent.

The Azucarera Tucumana is another very important local sugar company. Its capitalization is approximately $4,000,000 o/s, and the average pre-war dividend rate was approximately 6 per cent per annum. For the year ended March 31, 1916, the profits were not sufficient to warrant dividend payments. No recent quotation for the shares has been made public, the last recorded sale having taken place in 1913 at 98 per cent.

The Refinería Argentina is one of the largest enterprises of its kind in Argentina. Its paid-up capital is $2,000,000 o/s. Dividends before the war averaged 7½ per cent; for the years 1915 and 1916 the rate was 6 per cent. No recent quotation for the shares is available (97.50 in 1912).

Three other important sugar refineries and properties, locally owned, are the Ingenio y Refinería Santa Ana (Ltda.), the Ingenio

San Miguel, and the Nueva Compañía Azucarera y Refinería Ledesma (Ledesma, Jujuy). The respective capitalizations of these three companies are $8,500,000 m/n, $1,000,000 m/n, and $10,000,000 m/n.

MEAT-PACKING COMPANIES.

The extent and development of the great meat-packing industry in the River Plate countries is little realized by those who have never with their own eyes investigated this field of enterprise. Argentina, of course, stands foremost in this industry, although Uruguay, Brazil, Paraguay, and other South American countries are progressing, particularly as cattle producers. Despite the increasing share of the world's meat trade that is being obtained by these Republics, Argentina will not lose its prominence. The United States, which in 1907 exported 282,000,000 tons of beef, so increased in population that at the outbreak of the war the annual exports had dropped tc 6.400,000 tons, while the exports of beef cattle dropped from 585,000 to 22,000 head. In addition, the United States has been purchasing beef from Argentina and elsewhere. Argentina has spent millions on the importation of pedigreed stock, and to this is due the present high quality of its meat. Argentina commenced its shipments of frozen and chilled meats to Europe as early as 1877. Within the next few years the industry developed by leaps and bounds, largely owing to the investment of foreign (particularly British) capital. Within the last few years (since 1907) the United States has become a real factor in the meat business of Argentina, and as will be shown later, American investments in this field have resulted in substantial profits. Formerly the entire meat-producing industry centered in the Province of Buenos Aires, within reasonable distance of the River Plate. During recent years, however, attention has been drawn to Patagonia, and plants have been erected at Rio Gallegos, San Julien, and Puerto Deseado, Territory of Santa Cruz, and a syndicate has been formed to establish freezing and canning works in the Argentine Territory of Tierra del Fuego.

Ten meat-freezing establishments are in operation at the present time in the Province of Bueno Aires. During 1916 these 10 establishments slaughtered 1,925,281 head of cattle, 2,334,937 sheep, and 64,996 pigs, representing a cost price to the meat establishments of $361,012,165 m/n. The 10 establishments represent an invested capital of $116,374,774 o/s, and employed a total of 939 machines. of which 585 are worked by electricity, 158 by hydraulics, and 196 by steam, the combined horsepower being 28,922. In 1916 the employees in these plants numbered 15,492.

Practically all the British companies engaged in the meat-freezing industry, as well as the two important local concerns, are described in the Appendix. It may be of interest to indicate the profits of the energetic American concerns that have entered the field. The following table shows the paid-up capital that these companies have invested in Argentina, and also their profits from operation for the calendar year 1916:

Companies.	Paid-up capital (in Argentina).	Profits, 1916.
	$o/s.	$o/s.
Armour & Co	3,000,000	[a] 672,463
La Blanca (Morris-Armour)	1,500,000	[b] 1,520,901
Swift & Co	7,500,000	2,758,940
Argentine Central (Wilson)	300,000	915,035
Total	12,300,000	5,867,339

[a] Year ended June 30, 1916.

[b] After allowing $100,000 depreciation.

The Armour & Co. La Plata plant was inaugurated July 4, 1916, the cost, it is stated, having been $3,500,000 o/s. The plant is located at Rio Santiago, Gran Dock, La Plata, and covers 20 acres. Its official name is Frigorífico Armour de la Plata.

The La Blanca Co. plant formerly belonged to Swift & Co., but in 1912 was acquired by the Armour and Morris companies. It is interesting to compare the 1916 profits ($1,520,901 o/s, as above) with those for 1914, when they totaled $276,704 o/s and returned a dividend of 10 per cent.

Swift & Co.'s La Plata Cold Storage Co., which in 1916 showed a profit of $2,758,940 o/s (as above), was registered October, 1910. Net profits for 1914 were $1,518,575 o/s. There has been, therefore, a substantial increase during the years of war.

The Sociedad Anónima Frigorífico Argentino Central, owned and operated by Wilson & Co., reported, as stated above, a profit for the calendar year 1916 of $915,035 o/s, which, added to the balance of $1,121,974 o/s carried forward from 1915, made a total of $2,037,009 o/s, of which $1,990,169 o/s was carried forward after dividend payments. The paid-up capital consists of $240,000 7 per cent preferred and $60,000 common.

Although the British meat-freezing companies have enjoyed large earnings, their divided profits since the war have not been exceptionally large, owing to the excess-profits tax. Quotations of a few of these shares follow:

Securities.	Amount.	Par value.	High price since 1911.	Price January, 1918.
British & Argentine Meat ordinary	£1,033,000	£1	23s.	22s.
Argentine Estates of Bovril preference	400,000	1	£1$\frac{1}{16}$	£⅞
Smithfield & Argentine Meat ordinary	325,000	1	1⅜	1⅜
Liebig's Extract of Meat ordinary	600,000	5	24	23½

The capitalization of the British & Argentine Meat Co., including debentures, is as follows: Ordinary, £1,033,000; 6 per cent cumulative and participating preference, £449,500; 5 per cent first debenture stock, £73,523; 6 per cent redeemable debenture stock, £572,865; total capitalization, £2,098,888. The dividend payment for 1915–16 was 12½ per cent. The property is located at Campana, Province of Buenos Aires.

The Argentine Estates of Bovril is capitalized as follows: Ordinary, £241,014; 6 per cent cumulative and participating preference, £400,000; 4½ per cent debentures and debenture stock, £427,900; 5½ per cent debenture stock, £200,000; total capitalization, £1,268,914. Regular dividends of 6 per cent were paid on the preference shares to and including 1913-14. In each of the years 1915 and 1916 3 per cent was paid, and in 1917 4 per cent was paid. No dividends are being paid on the ordinary shares.

The ordinary shares of the Smithfield & Argentine Meat Co. (Ltd.) represent its entire capitalization. The dividend payment on this stock for 1916 was 15 per cent. The plant of this company is located at Zarate, in the northern part of the Province of Buenos Aires.

The capitalization of the Liebig's Extract of Meat Co. consists of £600,000 ordinary shares, £1,000,000 5 per cent preference shares, and £400,000 other obligations—a total of £2,000,000. In addition to its properties in Argentina this company owns lands and factories in Uruguay, Rhodesia, and Southwest Africa. The 1916 dividend on the ordinary shares was 25 per cent.

The Compañía Sansinena de Carnes Congeladas (Ltda.) is a very important locally owned meat-freezing company. It is headed by Carlos A. Tornquist and numbers among its directors Mr. Samuel Hale Pearson. The company has outstanding $3,000,000 o/s ordinary shares, $1,500,000 o/s 6 per cent preference shares, and £140,000 5 per cent debentures. The ordinary shares received 25 per cent in dividends in 1915 and in 1916, as compared with an average of 10 per cent per annum before the war. The shares are listed on the Buenos Aires Stock Exchange and sell at about $140 o/s per share. The debentures are quoted on the London Stock Exchange. The freezing establishments are located at Avellaneda (a suburb of Buenos Aires) and at Bahia Blanca. They are known as "La Negra" and "Cuatreros."

Exports of the leading meat-freezing companies for the six months ended June 30, 1917, were as follows (slightly less than for the similar period during 1916):

Companies.	Frozen sheep and lambs.	Quarters frozen beef.	Quarters chilled beef.
Cía. Sansinena de Carnes Congeladas	125,543	102,755	24,336
Las Palmas Produce Co. (British & Argentine Meat Co.)	208,663	715,584	63,255
La Blanca (Morris-Armour)	112,514	282,222	50,003
Swift & Co. (La Plata)	116,393	366,200	120,526
Argentine Central (Wilson & Co.)	40,890	131,395	22,506
Smithfield & Argentina	102,741	118,200	23,723
Armour de la Plata	164,713	341,326	47,504
Anglo-South American Meat Co	54,597	78,484	....

The New Patagonia Meat & Cold Storage Co. (controlled by Swift & Co., capital £100,000), the Compañía Frigorífica de Patagonia, and the Sociedad Exploración de Tierra del Fuego did not directly export any meat during the period mentioned, presumably on account of the scarcity of ship tonnage.

Further facts concerning the River Plate meat industry will be found in the chapter on Uruguay, as well as in the Appendix. It need scarcely be said that the industry is enjoying unprecedented prosperity—a condition that is likely to outlast the European war for a considerable period of time. Every variety of animal product is in demand at the present time, and, despite the strikes and labor troubles with which the companies have had to contend at times, the returns will continue to be large.

MANUFACTURING AND COMMERCIAL PURSUITS.

Argentina as a nation is engaged primarily in pastoral and agricultural rather than commercial pursuits. Notwithstanding that fact, manufacturing has developed to a moderate extent and has attracted a fair amount of capital, some of which has come from European sources. In the following table, transmitted by Commercial Attaché Robert S. Barrett, is a statement of the industries of the country as shown by the census of 1913, with the number of establishments, capital invested, total production, raw material consumed, horsepower used, and number of persons employed. The values in Argentine paper currency have been converted into United States currency at the rate of 42.5 cents.

Kind of industry.	Number of establishments.	Capital invested.	Total production.	Raw material consumed.	Horsepower used.	Number of persons employed.
Meat packing houses	13	$39,521,561	$114,004,927	$98,109,228	24,287	14,687
Flour mills	401	36,878,953	63,282,112	52,038,119	26,831	4,909
Sugar refineries	44	51,055,362	59,754,304	34,438,136	57,511	14,685
Preparation of wine	4,317	77,658,543	36,248,745	17,449,659	14,651	16,362
Bakeries	3,242	13,634,840	34,709,770	19,236,188	6,514	27,105
Foundries and metal works	1,177	25,389,184	24,987,634	12,851,834	14,161	16,109
Cigarette factories	55	13,552,383	22,471,474	6,553,601	1,191	4,295
Dairies, cheese factories, etc	8,161	42,833,791	22,439,534	12,565,114	3,317	28,589
Tailors	3,083	14,365,803	21,554,202	14,750,637	34	21,380
Leather shoes	231	9,126,084	20,884,830	11,800,976	2,388	12,869
Sawmills	305	8,940,018	19,220,005	14,059,505	13,514	7,378
Extracts of tannin and preparation of firewood	493	33,212,346	17,778,903	....	12,874	19,616
Jute and cotton sacks	24	8,970,475	16,200,466	13,739,672	1,248	1,808
Lithographers and printers	938	12,338,093	15,409,435	5,380,739	2,985	11,491
Breweries	29	13,702,876	15,163,839	3,366,630	8,680	2,599
Carpentry, painting, and horseshoeing	4,681	9,970,046	15,150,120	6,257,618	3,970	18,454
Liquors	326	8,984,383	13,775,247	7,621,173	1,518	3,035
Tanneries	189	8,396,155	13,655,719	8,933,491	5,416	3,474
Woodworking	736	4,843,097	12,503,539	6,674,605	6,906	5,903
Cotton and woolen mills	81	9,155,267	10,722,594	5,993,741	6,887	8,384
Furniture, trunks, and tapestry	1,058	9,242,590	9,771,501	3,798,159	2,206	8,101
Leather goods	986	5,349,305	9,746,658	5,968,603	326	5,497
Brick kilns	953	7,545,538	9,383,312	2,126,196	2,090	10,485
Preparation of herva matter	31	3,137,775	9,328,448	5,327,953	1,128	1,051
Soap factories	294	4,111,091	9,123,774	6,340,394	964	2,092
Clothing, etc	448	5,698,993	8,772,495	4,420,091	657	4,986
Chocolate and candy	299	4,672,106	8,761,916	6,108,327	2,337	3,854
Wagons and carriages	1,270	6,437,754	8,519,085	3,698,430	3,882	8,291
Macaroni and pastes	332	4,601,288	8,261,764	5,792,369	4,216	3,880
Ice and aerated waters	742	7,973,585	7,290,659	2,772,847	7,965	3,864
Rope and cloth shoes	241	3,714,781	7,133,657	3,892,221	1,097	4,764
Match factories	16	975,163	5,951,700	1,508,819	610	3,094
Crackers and cakes	207	2,800,278	4,451,572	2,369,431	588	2,062
Jewelry, watches, etc	769	4,198,454	4,098,250	1,922,813	43	2,231
Hats	92	2,671,231	3,662,194	1,825,152	1,298	2,362
Paper and cardboard mills	11	4,922,945	3,616,611	1,914,971	10,860	1,901
Alcohol	187	3,935,447	3,364,134	128,775	1,456	1,133
Dressmakers	574	2,474,434	3,300,508	1,110,719	15	3,754
Tinsmiths, etc	974	1,930,730	2,878,153	1,053,603	133	3,071
Preparing and refining oil	22	1,759,411	2,750,706	1,987,128	969	468
Fishing	4	1,957,295	2,416,961	10,625	17	278
Coffee roasters, etc	54	1,537,225	2,300,725	1,542,618	191	517
Cigars and tobacco	179	1,579,330	2,162,705	1,111,775	95	2,826
Confectionery	185	1,493,698	2,024,445	1,126,378	113	1,856
Glass factories	16	2,479,875	1,807,950	537,838	269	2,136
Gas fitters, etc	353	2,215,845	1,803,173	702,638	25	2,321
Cleaners and dyers	124	1,478,283	1,455,873	201,358	1,031	1,641
Artistic iron work	35	987,308	1,434,744	622,541	242	827
Petroleum refineries	1	3,187,500	1,062,500	637,500	265	220
Washing wool	10	673,731	1,038,545	748,255	885	255
Ore smelting	29	8,741,770	744,987	4,250	797	793
Preparation of salted hides	8	68,425	209,950	169,788	55	45
Construction companies	197	10,587,395	....	....	565	7,664
Paving companies	14	3,853,914	5,397,755	3,056,876	140	1,932
Light and power companies	305	127,875,724	....	....	391,959	9,916
Grain elevators	19	8,641,962	....	....	6,137	1,666
Other	6,971	47,173,084	62,487,327	33,614,817	18,479	48,093
Total	48,779	759,756,475	791,260,627	461,881,333	678,757	410,201

The census of 1913 was the first complete survey of Argentine industries that has ever been made. In 1895 a partial census was taken, which showed that the number of establishments at that time was 22,114.

Since the statistics for the 1913 census were obtained there has been a marked increase in the number of manufacturing establishments in the country. Many articles that were formerly imported from abroad and that can not be obtained from foreign sources at present are now made locally, and the high prices for foreign-made goods in the countries where they are produced, together with the exorbitant freight rates, have made the manufacture of these articles in Argentina very profitable.

Concerns in general commercial lines in Argentina, as of the year 1916, numbered as follows:

Localities.	Number of concerns.	Annual business.	Capitalization.	Number of employees.
		$ m/n	$ m/n	
Buenos Aires	20,690	2,232,506,291	750,320,546	118,360
Provinces of Cordoba, Mendoza, Santa Fe, and San Juan	21,654	1,094,081,592	447,437,758	58,660
Total	42,344	3,326,587,883	1,197,758,304	177,020

In addition to the above there were 71 telephone companies, capitalized at $34,750,423 m/n and employing 4,494 persons; 143 banks, capitalized at $1,255,533,077 m/n and employing 10,834 persons; and 85 insurance companies, capitalized at $74,056,270 m/n and employing 1,549 persons.

The brewing industry in Argentina dates from 1868. In 1917 there were 25 breweries, with share and debenture capital of $32,489,800 m/n and $5,246,418 m/n, respectively. The capital invested in buildings, machinery, and raw material amounted to $64,248,020 m/n. The output of the breweries for 1915–16 was 77,085,933 liters (20,363,831 gallons), as compared with 116,321,488 liters (30,728,698 gallons) in 1913–14. The capacity of the establishments is 177,790,000 liters (46,966,865 gallons) annually. Gross sales for 1915–16 were $26,299,556 m/n, as compared with approximately $27,000,000 m/n in 1914–15 and approximately $38,000,000 m/n in 1913–14. Taxes paid amounted to $4,036,426 m/n. Bieckert's Brewery is about the only one whose shares are known abroad. This company's shares have declined somewhat in price, as is shown by the following table:

Securities.	Amount.	High price since 1911.	Price January, 1918.
Ordinary shares	£375,000	138	72
Preference shares (5 per cent)	311,000	89	67
4 per cent first debenture stock	92,000	96	70
5 per cent irredeemable debentures	100,000	97	77

In addition to the above capitalization there is outstanding a small issue of 6 per cent debentures. The dividend rate on the ordinary shares for 1917 was 5 per cent (1913, 9 per cent).

The Distilería, Bodegas y Cervecería Germania (also engaged in the manufacture and sale of liquors and wines) is capitalized at $3,000,000 o/s ordinary and $1,500,000 o/s 7 per cent preference shares. Dividends on the ordinary shares in recent years have been as follows: 1911 and 1912, 16 per cent; 1913, 16 per cent; 1914, 14 per cent; 1915, 11 per cent; and 1916, 12 per cent. The preference shares sell (September, 1917) at par to 102 per cent and the ordinary at 150 per cent. In 1914 the ordinary shares were quoted at 170 per cent and in 1913 at 187 per cent. Most of the securities of the company are locally held.

The Cervecería Palermo, a brewery whose shares are held in Argentina, is capitalized at $1,000,000 m/n ordinary and $500,000 o/s preference. No dividends were paid on the ordinary shares during 1916. Formerly the rate averaged from 6 to 9 per cent.

Dividends of 3 per cent are paid on the ordinary shares of the Cervecería Segundo. Formerly the rate was 9 to 10 per cent.

A few of the various industrial companies, wholly or partly financed abroad, are the Argentine Refinery, the Argentine Tobacco Co., the Argentine Navigation Co., the Argentine Iron & Steel Co., and the Catalinas Warehouses & Mole Co. Among the commercial companies are Harrods and the Gath & Chavez South American Stores—two leading department stores—the City of Buenos Aires Central Produce Market, the Argentine Central Leather Co., etc. A brief description of most of these companies will be found in the Appendix.

Shares of industries and commercial companies held locally in Argentina and actively quoted are not numerous. The $50 o/s shares of the Central Fruit Market (capital $3,000,000 o/s) were quoted in September, 1917, at $85 o/s (1916 dividend 12 per cent). Introductora de Buenos Aires (importers) shares were quoted at the same time at 118 (10 per cent is paid), the capitalization being $1,000,000 o/s. Argentina de Papel (paper) shares are quoted (September, 1917) at $48 ($50 par) as compared with $130 high in 1913 and $35 in 1915. Twelve per cent was paid on these shares in 1916. The Compañía General de Fósforos (match factory) is capitalized at $5,100,000 m/n; 25 per cent per annum is paid on the shares, which were quoted in September, 1917, at 320 per cent. These shares in 1913 reached a price of 450 per cent. Puerto San Nicolas shares ($7,425,000 m/n) were quoted in September, 1917, at $20 m/n (par $45 m/n), as compared with the high price of $63.50 m/n in 1913. The dividend rate on these shares for 1916 was 2.2 per cent. This company operates the port and docks at San Nicolas on the Central Argentine Railway. A still larger port company is the Muelles y Depósitos del Puerto de la Plata, owning a wharf and warehouses at La Plata and capitalized at $6,400,000 o/s. The latest dividend on these shares was 1.6 per cent, and the September, 1917, price was $18 o/s per $25 o/s share.

In addition to the few manufacturing, commercial, and miscellaneous concerns mentioned above, there are a number with capitalizations ranging from $1,000,000 to $10,000,000 and upward. The subject is too exhaustive to be dealt with fully. Generally speaking, the various manufacturing enterprises are on a sound and paying basis, despite high costs of fuel and power. It is hardly necessary to repeat the statement that Argentina is, and will continue to be for many years, an agricultural and pastoral country.

BOLIVIA.

INTRODUCTION.

The area of Bolivia is estimated at from 473,560 to 704,195 square miles—equal, if the latter figure is correct, to more than 14 times the size of New York State or 2⅔ times the size of Texas. Its population is stated to be about 2,500,000. The Republic is one of the richest mineral countries in the world and is destined in the not distant future to increase considerably its output of tin, silver, copper, and other valuable products. Improved railway facilities and the activity and enterprise of a thoroughly progressive Government are placing the resources of this vast yet thinly settled country within reach of foreign markets. Although most of the country's development has taken place within its great central plateau, where practically all of its mines are located, the greatest future opportunities—once means of communication are established—exist, it is said, on the eastern slope of the Andes and among the plains in the eastern and southern parts of the Republic. The area of possible cultivation in this section covers many thousands of square miles, and nearly every product of the Torrid and Temperate Zones may be successfully grown. In the forests of the extreme eastern lowlands may be found mahogany, ebony, cedar, rosewood, satinwood, rubber, cork, etc. Thousands of wild cattle thrive on the long grasses of the southeastern plains; wild coffee, for which there is a ready domestic market, is found, as are vanilla and other tropical products.

Bolivia's foreign trade for the years 1912 to 1915 is here shown:

Years.	Imports.	Exports.	Total trade.
1912	$19,258,996	$35,057,841	$54,316,837
1913	21,357,505	36,551,390	57,908,895
1914	15,506,876	25,662,447	41,169,323
1915	9,009,826	38,084,144	47,093,970

In the year 1902 imports amounted to approximately $5,600,000 and exports to approximately $11,100,000.

The chief cities of Bolivia are La Paz, the highest capital city in the world, lying in a circular valley about 11,900 feet above the sea (population, 85,000); Cochabamba, which on account of its location is expected to grow rapidly in size and importance (population, 27,000); Potosi, a mining city (population, 25,000); Sucre, the nominal capital (population, 24,000); Oruro, an important mining and trading center (population, 22,000); and Santa Cruz, the most important center of eastern Bolivia (population, 20,000).

Bolivia has upward of 5,600 miles of navigable rivers, all (except the Desaguadero, 185 miles) flowing in the direction of the Atlantic Ocean by way of the Amazon or the Paraguay—the latter an affluent of the River Plate. Lake Titicaca, the great inland body of water, forming a section of the boundary between Bolivia and Peru, covers an area of 5,187 square miles and is navigable for steamers of considerable size. At the present time navigation is confined to the Peruvian Corporation's fleet of small steamers (650 to 1,000 tons), a few small sailing vessels, and a number of native balsas or reed boats.

There are few industries of importance on this lake. On the shores of the lake and along the slopes of the near-by Sierras are some of the finest grazing lands in South America. The country, with its excellent water supply, is better adapted for sheep raising than Australia. Land values are low, and labor is cheap and plentiful. The quality of the sheep found in this district is poor, owing to the present general lack of knowledge concerning breeding methods. Excellent opportunities exist for the ranching of sheep on a large scale, provided good sheep are imported for breeding purposes. The Indians, who form a very large percentage of the population of the lake district, devote themselves mainly to agriculture and fishing. Their methods are similar to those in use thousands of years ago. The produce raised by these Indians finds a ready market in La Paz and other places on the Bolivian plateau.

Among the various Departments and Territories of Bolivia La Paz is the most important. It contains approximately one-fifth of the nation's population. Three of Bolivia's most important railways enter the Department, affording means of communication with Peru and Chile and with various parts of the Republic. Oruro is probably next in importance to La Paz, containing as it does considerable mineral wealth, although little agricultural land is available. Oruro, the capital of the Department, is a railroad center of some importance. Potosi, which was long the treasure house of Bolivia but which some years ago declined in importance, is evidencing returning prosperity since the completion of the railway to Potosi, its capital city. The Department of Chuquisaca, in which is located Sucre, the nominal capital of the Republic, contains a number of mines and some manufacturing industries. The Department will increase in importance when railway communication is established with Sucre. Cochabamba is believed by many to be the Department holding the greatest promise for the future. Splendid fruit and agricultural lands are found there, as well as minerals of various kinds. Cochabamba, its capital, is the main center for the purchase of supplies for the Beni River district and other sections of eastern Bolivia. Several rivers water the Department.

In eastern and central Bolivia—the lower country—Santa Cruz is the most important among the Departments and Territories. Its area exceeds 140,000 square miles, and its population is about 200,000. Sugar, cotton, coffee, rice, maize, tobacco, and similar products are being cultivated in increasing quantities. Mahogany and other hardwoods, dyewoods, and other forest products, including rubber, are found. In this Department there are large petroleum deposits of a rich quality, which will certainly be profitably exploited when railway communications are established with the mining country to the westward or with Argentina. Salt, coal, gold, tin, copper, iron, and other minerals exist in this region. It is an extremely rich country, awaiting the day when better means of communication will place its resources before the outside world. Railways into the district are projected, but will probably not be built at this time. The Acre Territory and the Beni Department are thinly settled, containing mostly wild Indians. Puerto Acre, the capital of the Acre Territory, is in communication with the Amazon, via steamer and the Madeira-Mamore Railway (see Brazil, p. 155). Rubber is the principal resource of that Territory, although the forests contain vast undeveloped timber wealth, unavailable now because of the cost of transportation. The climate during the rainy season is unhealthful. The Beni Department contains large quantities of rubber in its forests. On the great stretches of open plains are large herds of wild cattle. Tropical plants and fruits, as well as maize, tobacco, and rice, thrive in this district.

GOVERNMENT LOANS AND FINANCES.

Bolivia's financial record has been an excellent one. The Republic has carried on its development work slowly and carefully and deserves high credit for the manner in which it has taken care of its foreign obligations. Its external debt is far from excessive and mostly represents expenditures for improvements that have done much to open the country for settlement and development.

As of June 30, 1917, the debt of the Republic amounted to 63,813,895 bolivianos (equivalent to $24,842,749 United States currency), divided thus: External debt, 40,642,151 bolivianos ($15,821.989 United States currency); internal debt, 23,171,744 bolivianos ($9,020,760). On the date mentioned the external debts were as follows:

Items.	Amount.	
	Bolivianos.	United States currency.
Morgan loan of 1909; 6 per cent; original issue $2,432,500; balance amortized	4,935,151	$1,921,255
French loan of 1910; issued by the Crédit Mobilier of Paris; secured by export duty on minerals and rubber and, in event of deficit, on general revenues; tax-free in Bolivia; interest rate 5 per cent; sinking fund 1½ per cent; original issue $7,213,750	17,218,000	6,702,967
French loan of 1913, for the construction of the La Quiaca-Tupiza Railway; original issue $4,865,000; interest 5 per cent, and sinking fund	11,976,500	4,662.451
Warrants to bankers, 1910 loan	262,500	102.191
Chandler & Co.; interest and amortization payable by Department of La Paz	6,250,000	2,433,125

The outstanding external debt on June 30, 1917, amounted to 4,301,555 bolivianos ($1,674,594) more than on June 30, 1916. The internal debt during the same period showed an increase from 16,870,760 bolivianos ($6,567,785) to 23,171,744 bolivianos ($9,020,760).

The 5 per cent Crédit Mobilier Loan, floated in Paris, was offered for subscription in November, 1910, at a price of 485 francs per 504-franc bond (96.2 per cent). The bonds were readily absorbed by banks and investors, and during the years 1911 and 1912 sold regularly above par. Recently the bonds, owing largely to war conditions, sold on the Paris Bourse at 405 francs. The bonds are repayable in or before November, 1940, by means of the sinking fund. The Morgan Loan was largely repurchased by the Government several years ago, but bonds, other than those amortized, have not been canceled.

During the year ended June 30, 1917, Bolivia paid up the National City Bank loan, which on June 30, 1916, had been outstanding to the amount of 1,274,167 bolivianos ($496,033).

A loan was recently contracted with the American banking firm of Chandler & Co. to provide funds to construct the Yungas Railway, extending from La Paz into the Province of Yungas, Department of La Paz. This loan was for $2,433,125, and the rate is believed to be 6 per cent.

Among the Republic's internal obligations, the so-called Bonds Militar are quoted at 85. They carry 10 per cent interest.

A loan for £96,500 was created by the Government in October, 1916, and was subscribed for proportionately by the various Bolivian banks. The Government repaid this loan in January, 1917.

The service of loans, 1915–16, required 2,957,763 bolivianos.

As stated, Bolivia has made a very creditable financial record. The revenues of the Government were first affected seriously by the collapse of the rubber industry, due to the drop in price and to plantation-rubber competition. This was followed almost immediately by the war, which for the time being caused a crash in the price of tin and paralyzed the foreign trade of the country. The year 1914 was also characterized by a crop failure, and the Government was virtually compelled to suspend duties on various necessary imports. Recovery was slow in the extreme, and even to-day imports and import duties are below normal, although the country is enjoying a comparative boom in its mineral industry. The Republic emerged from the storm successfully and is now practically reestablished on a sound financial basis. The end of the war will cause a vast increase in imports, as merchants' stocks throughout the entire Republic are very low.

MUNICIPAL LOANS.

None of the Bolivian municipalities have any external bonds outstanding. Some of the cities have borrowed sums for municipal improvements either from banks or from other local interests. None of these loans are large. Bonds of the city of La Paz, which are occasionally dealt in locally and which are entitled to interest at the rate of 10 per cent per annum, sell at 60. Interest is said to be paid somewhat irregularly. La Paz is seeking arrangements whereby better sewerage facilities may be obtained and a filtration system provided for the purification of the water used in the city. The revenues of the two systems are offered as security. It is said that well-known American financial interests are investigating the proposition.

BANKS.

The banks of Bolivia as of June 30, 1916, had a total capitalization of $16,365,000. Deposits on that date amounted to $10,949,965. Gold reserves were £1,016,986. Paper currency amounted to $9,691,197. Reserves of the banks totaled $2,394,304.

The leading banks of Bolivia are the Bank of the Bolivian Nation (Banco de la Nación Boliviana), the National Bank of Bolivia (Banco Nacional de Bolivia), the Francisco Argandoña Bank (Banco Francisco Argandoña), the Mercantile Bank (Banco Mercantil), the German Transatlantic Bank (Banco Aleman Transatlántico), and the banking house of Gutierrez Guerra (Casa Bancaria Gutierrez Guerra). There is also a National Mortgage Bank (Banco Hipotecario Nacional), which was incorporated in La Paz in 1890. In Sucre there is a similar institution—the Banco Hipotecario Garantizador de Valores.

The Bank of the Bolivian Nation was founded in 1911, largely for the purpose of standardizing the then widely fluctuating foreign-exchange market. It absorbed the Banco Industrial and another institution. The Government used £1,000,000 of the proceeds of the French loan of 1910 to establish this bank. The capitalization was fixed at £1,114,000, of which the Government acquired £1,000,000 shares at par. The remaining shares were offered for subscription and were acquired largely by French capitalists, although some of the shares are held in La Paz. Profits for 1916 amounted to approximately $883,025, equal to nearly 13 per cent on the stock. Deposits at the leading branches were divided in the following proportions: Cochabamba, 32.31 per cent; Sucre, 22.71 per cent; La Paz, 19.77 per cent; Potosi, 19.05 per cent; Tarija, 6.16 per cent. Branches also exist in Oruro, Santa Cruz, and El Beni. Six of these branches are operated with profit. Dividends for the year amounted to 12s., equal to 6 per cent. Eugenio Carpentier, of La Paz, is the director general. Shares of the bank are quoted in La Paz at 105.

The National Bank of Bolivia was established in the year 1870. Its authorized capital is £1,000,000, or 12,500,000 bolivianos; 8,000,000 bolivianos of the capital is paid in. There is a fund for reserve of 1,600,000 bolivianos and other funds for dividends, etc., totaling 792,105 bolivianos. The head office of this institution is at Sucre, and there are branches at La Paz, Oruro, Cochabamba, Potosi, Tarija, Tupiza, and Uyuni. The bank's shares are quoted at 128.

The Francisco Argandoña Bank is capitalized at 4,000,000 bolivianos. Its head office is at Sucre, and there are branches at La Paz, Cochabamba, Oruro, and Potosi. The shares of the bank were quoted at 65 in April, 1917.

The Mercantile Bank is a private organization controlled by Señor Simon T. Patiño. Its head office is at Oruro, with branches at La Paz, Uyuni, Cochabamba, Tupiza, Sucre, Potosi, Santa Cruz, and Tarija. The capitalization of the bank is £2,000,000. As the shares are privately owned there is no quotation for them.

The German Transatlantic Bank, a German organization that in past years was a power in South America, has an establishment at La Paz. There is a branch at Oruro and agencies in other cities. The bank's Bolivian operations are said to have resulted very profitably. Shares of this bank are not quoted in Bolivia.

Shares of the National Mortgage Bank are quoted at 320. The capitalization of the bank is 100.000 bolivianos. The Sucre mortgage bank is also capitalized at 100.000 bolivianos. This institution maintains a branch at Cochabamba. Its president is J. A. Fernandez. The Mercantile Bank maintains a mortgage department (sección hipotecario), which is capitalized at 800.000 bolivianos. There is also a somewhat similar organization known as the Crédito Hipotecario de Bolivia. This is capitalized at 560.000 bolivianos.

Bolivian merchants seem to be of the almost universal opinion that an American branch bank would be successful in the Republic.

RAILWAY DEVELOPMENT.

On July 4, 1917, following the establishment of train service to Cochabamba, Bolivia had approximately 840 miles of railway. Final completion of lines under active construction will, within the next two or three years, increase the mileage to about 1,100; and if the elaborate program of railway construction as projected is carried out, the country will in time possess more than 3,000 miles of line.

There are, as is generally known, three railway outlets for the commerce of Bolivia: (1) the Antofagasta & Bolivia Railway, to Antofagasta, Chile; (2) the Arica-La Paz Rail[illegible] to Arica, Chile; (3) the Guaqui-La Paz Railway, which connec[illegible] ste[illegible]ers on Lake Titicaca running to Puno, Peru, where [illegible] are with the Peruvian Southern Railway, to [illegible] Peru. [illegible] three railways the most important is the Antof[illegible] & Bolivia Railway, the longest and oldest line in the Republic.

ANTOFAGASTA & BOLIVIA RAILWAY.

The Antofagasta & Bolivia Railway was built originally to provide an outlet for the nitrate properties of the Compañía Salitres de Antofagasta. No outlet existing for the mineral products of the Huanchaca Mine, located at Huanchaca, near Uyuni, Bolivia, the owners of the mine purchased the railway. This was in 1884. The line was completed as far as Uyuni in the year 1888. In 1889 the property was disposed of to the present company for approximately $10,000,000. The road was continued to Oruro in 1892, and from that time began an expansion of earnings and profits. To-day the railway is one of the best managed and most profitable in South America. It has taken over, under lease, the Bolivia Railway, hereinafter described, and now presents a through route between La Paz, Potosi, Oruro, and other important Bolivian cities and the Pacific ports of Antofagasta and Mejillones, Chile. Gross earnings from the railway (Chilean and Bolivian sections) for the calendar year 1915 amounted to £1,220,581 ($5,939,950), as compared with £1,430,927 ($6,963,600) in 1914 and £1,811,775 ($8,817,000) in 1913. In 1916 gross earnings increased to £1,852,655 ($9,015,946) and in 1917 to £2,239,384 ($10,897,962).

The Bolivian section of the Antofagasta & Bolivia Railway, with which the present discussion deals, is 302 miles in length, not including the Bolivia Railway section. Earnings of this division for 1915 amounted to £184,556 ($898,140), as compared with £281,359 ($1,369,-235) in 1914. Net earnings for 1915 were £75,556 ($367,695), as compared with £132,264 ($643,665) in 1914. Passengers carried on the Bolivian section during 1915 numbered 23,466 first-class (31,444 in 1914) and 89,705 second-class (133,307 in 1914). There was a corresponding decrease in passenger receipts from £37,503 ($182,500) to £22,304 ($108,540). In 1916 and 1917 gross earnings of the Bolivian section totaled £249,209 ($1.212,776) and £318,486 ($1,549,-912), respectively. Net earnings for the two years were £79,213 ($385,490) and £129,654 ($630,961). Both freight and passenger business showed a consistent increase.

During 1915, 33.132 tons of tin were carried, as compared with 38,022 tons in 1914; in 1916 there was a further increase in the amount transported. A total of 32,528 tons of silver in bulk was handled in 1915, against 34,715 tons in 1914. The haul of this mineral is comparatively short—Oruro to the smelters. The traffic in antimony is also quite important, 15,207 tons being carried in 1915, as compared with only 181 tons in 1914. This traffic, which was also large in 1916, may be said to be temporary, as all of this mineral is shipped for use in the European war. Metals from the Huanchaca mines, largely zinc blends, were carried to the amount of 8,369 tons, as compared with 13,836 tons in 1914. Up traffic in coal, flour, and general merchandise in 1915 was also considerably less than in 191[illegible] [illegible]xpected that the opening of the Cochabamba [illegible]ivia [illegible] in July, 1917, will bring additional traffic [illegible]in [illegible]ter (3.28-foot) gauge line between Oruro and Uyuni [illegible]mpleted in February, 1916, and it is expected that the remainder of the 2.5-foot gauge will be broadened in the not distant future. At the present time semiweekly train service is maintained between La Paz and Antofagasta, the trip taking 40 hours on the down run and 43 hours on the up run. Trains for Bolivia leave Antofagasta Tuesdays and Saturdays at 8 p. m. The down trains leave La Paz Tuesdays and Fridays at 2 p. m. In addition, train service is maintained over the Bolivia Railway section between La Paz and Oruro daily except Wednesday, while two or three mixed trains a week run between other Bolivian points. The Antofagasta & Bolivia Railway had in service December 31, 1915 (not including Bolivia Railway), 163 locomotives, 112 passenger cars, 3,247 freight cars, and 146 lighters, launches, etc.

The Bolivia Railway, whose lines have been leased by the Antofagasta & Bolivia Railway, was incorporated in the United States in 1907 and holds a perpetual concession from the Government of Bolivia for the construction of lines of railway in the Republic—in all about 773 miles. This mileage includes the following:

(1) *Oruro-Viachi line (continuing the Antofagasta & Bolivia Railway to La Paz).*—This line cost to December 31, 1913, $6,237,345. Its length is 126 miles, with no grades of importance. Together with other sections of the road, it has been leased to the Antofagasta & Bolivia Railway for a period of 99 years, from January 1, 1909.

(2) *Potosi division.*—This section, which extends from Rio Mulato (on the Antofagasta & Bolivia Railway) to Potosi, 108 miles, climbs to an altitude of 15,814 feet, the second highest altitude reached by any railway in the world. Potosi is the center of a rich mining section, and a fair amount of traffic originates along the line. The cost of this extension was approximately $8,052,575. Weekly passenger service is maintained over this division, the trip taking eight hours. The maximum grade along this section is approximately 3 per cent.

(3) *Oruro-Cochabamba line.*—This line, construction on which has been under way for several years, was expected to open for through traffic July 4, 1917. The total length will be about 132 miles, and the cost has exceeded $10,000,000. The railway's present right of way has been subjected to a number of washouts, and maintenance is fairly costly. The city of Cochabamba is, however, of considerable importance and seems destined to grow rapidly in the future. This division crosses the sierra at an altitude of about 14,000 feet and then rapidly descends to Cochabamba, which is located at an altitude of about 8,400 feet. The maximum grade is 3 per cent.

(4) *Uyuni-to-Atoche Palca extension.*—This extension was originally projected to Tupiza and has been surveyed to that point. The object of the line was to afford connection with the La Quiaca-Tupiza Railway, under construction by the Vezin Syndicate, of Paris. About $2,600.000 has been expended on this section thus far. The Antofagasta line has evinced no intention of carrying out further construction, and efforts are being made to procure funds to carry on the work under Government supervision. The cost of the 60 miles re-

maining uncompleted has been estimated at $5,000,000. Under present conditions it would probably exceed $6,500,000. The Government has offered as collateral for a loan to carry on this construction its £1,000,000 shares in the Bank of the Bolivian Nation.

An extension of the Oruro-Viachi line into La Paz is being built by the Antofagasta & Bolivia Railway. This extension is practically completed, although the softness of the soil along the down grade from Alto de La Paz to the city of La Paz has rendered construction difficult.

Practically all of the equipment in use on the Bolivia Railway is of American manufacture; that in use on the Antofagasta & Bolivia Railway has been mostly made in British shops.

ARICA-LA PAZ RAILWAY.

The Arica-La Paz Railway extends from the Chilean port of Arica to La Paz, Bolivia, and is the shortest route between the latter city and the coast. The main route from La Paz to Arica is 281 miles, comparing with 534 miles La Paz to Mollendo (Peruvian Corporation route) and 718 miles to Antofagasta (Antofagasta & Bolivia Railway). The highest altitude (13,986 feet) is reached near the Bolivian boundary. A total of 28 miles of rack rail is in use, the maximum gradient being 6 per cent. There are no tunnels on the Bolivian section although several are found in the Chilean section. The run from the Chilean-Bolivian boundary to La Paz is 150 miles, including 6 miles of the Guaqui-La Paz Railway from Alto de La Paz to the city.

The Arica-La Paz Railway has had to contend with innumerable difficulties during the past two years. Only two locomotives are available for the rack section of the railway and these are not sufficiently powerful to propel more than a very limited number of cars. Equipment is otherwise totally inadequate for the amount of business that the railway is called on to handle, and port facilities at Arica are not of the best, enlarged port works being urgently needed. The Government of Chile allows 40 days for the shipment of goods through Arica to Bolivia. So congested are conditions on the railway that this period is frequently exceeded before goods can be delivered across the border; this has caused a considerable amount of trouble, as on numerous occasions claims have been entered by the Chilean Government for duties on these shipments.

An order has been entered in the United States for an additional rack locomotive, which will slightly improve conditions. Efforts are likewise being made to have the Guaqui-La Paz Railway run cars over the line between Corocoro and Viachi to transport copper mined at the former place. At the present time practically no means are available for handling this copper, owing to lack of equipment on the Arica-La Paz Railway. It has been suggested that the rack rail section of the railway be electrified, and this change is under advisement by the Chilean Government. The property is a good one, and if adequately equipped would probably prove highly profitable. The Bolivian section taps the richest copper belt in the Republic. An extension of the Corocoro branch might readily be carried through to Oruro, probably the best railway-traffic center in the country, as there would be no construction difficulties of any kind. At the present time semiweekly passenger service is maintained between Arica and La Paz. Up trains leave Arica Mondays and Fridays at 4 p. m., making the run in 22 hours. The down trains leave La Paz Sundays and Thursdays at 4.15 p. m., making the down trip in 18½ hours. The single first-class fare is 66.40 Chilean pesos (approximately $14 United States gold at present rate of exchange). Sleeping accommodations cost 18.50 pesos ($3.90).

GUAQUI-LA PAZ RAILWAY.

The Guaqui-La Paz Railway (Peruvian Corporation), which is 60 miles long and which is the only railway at present operating directly into the city of La Paz, reaches its highest altitude at Alto de La Paz, 13,396 feet. The line extends from Guaqui, where connections are afforded with the steamers crossing Lake Titicaca, to La Paz. The Lake Titicaca steamers connect at Puno, Peru, with the Peruvian Southern Railway to Mollendo and Cuzco. Passengers on the up run must spend one night at Arequipa. On Fridays a train runs from Arequipa to Puno, connecting with the express steamer for Guaqui. Forty-seven hours, including the stop-over at Arequipa, are required for the journey. Saturday's train from Mollendo connects with the local daylight steamer on Lake Titicaca. On Sundays an express service is operated between La Paz and Mollendo, which enables the down journey to be made in 29 hours.

During the year ended June 30, 1916, gross earnings of the Guaqui-La Paz Railway totaled £42,470 ($206,680), as compared with £38,867 ($189,145) in 1914–15. Net receipts amounted to £10,152 ($49,400). These figures compare with £87,921 ($427,865) gross in 1912–13 and £38,351 ($186,635) net. Gross earnings in 1910–11 totaled £96,332 ($468,800). There were 109,307 passengers carried during 1915–16. The railway has a privilege zone of 12 miles on either side between the lake and Viachi. The gauge is 1 meter (3.28 feet), and equipment is of American make. The maximum gradient on the main steam line is 1.8 per cent and on the electric section 6.2 per cent. The railway property is carried on the books of its owners, the Peruvian Corporation, at £396,320 ($1,928,700).

OTHER RAILWAYS IN OPERATION OR UNDER CONSTRUCTION.

There are no other railways of importance at present in operation in Bolivia. A 24-mile line extends from Uyuni, on the Antofogasta & Bolivia Railway, to the Huanchaca silver mines; it is owned by the mining company. There is a 2-mile tunnel on this railway that was extremely difficult to construct. An electric line known as the Cochabamba-Vinto-Cliza tramway, controlled in Cochabamba, has been completed for upward of 45 miles, and additional mileage is under construction; its estimated total length is 57 miles. The Machacamarca & Uncia Railway, owned by Sr. Simon Patiño, is under construction and partly in operation between Machacamarca (near Oruro, on the Antofagasta & Bolivia Railway) and Uncia, where extremely rich tin mines exist. The railway may be extended to Sucre at some not distant date. Uncia is 52 miles from Machacamarca.

Important railways under active construction are:

(1) *La Quiaca-Tupiza Railway.*—This line, funds for which were largely raised by means of a loan floated in Paris during 1913, and for which a contract was let to the Vezin Syndicte of France, is to form a portion of the through

route between Buenos Aires and La Paz. When this line is completed from La Quiaca, on the Argentine frontier, to Tupiza, there will still remain 60 miles of somewhat difficult line to construct. The cost of linking this gap, as previously stated, was estimated some time ago at $5,000,000.

(2) *La Paz-Yungas line.*—This railway, the funds for which were largely raised by a loan of $2,400,000 furnished by Chandler & Co., of the United States, is under active construction between the city of La Paz and the Yungas province of the Department of La Paz. The line, which will be operated by electricity, will have to surmount some comparatively heavy grades, first at Alto de La Paz and later in reaching the top of the Sierra. It is claimed that a good traffic will be developed, especially in timber, a commodity much needed in La Paz and in other places on the Bolivian plateau. Vegetables are also grown in the Yungas territory, and there is a certain amount of mineral wealth. It is anticipated that some day the railway will be extended to Rurrenabaque, located near the head of navigation of the Beni River. The population of the Yungas district is mostly composed of Indians, some of whom are living in a comparatively wild state. The railway, which will be of meter gauge, is being constructed by the Bolivian Government and is under the supervision of local engineers. Up to the close of 1917 the amount expended on the La Paz-Yungas Railway totaled 3,078,831 bolivianos. In 1917 the expenditures totaled 1,467,899 bolivianos. The rails have been carried over the cordillera and early in 1918 were approaching Unduavi.

(3) *Potosi-Sucre Railway.*—Construction work under governmental supervision was commenced on this line in November, 1916. The railway, which will connect with the Bolivia Railway at Potosi, will, if completed, be the first line to reach the nominal capital of the Republic. It is expected that the line will be completed as far as Betanzo in about 18 months. In order to carry on the further construction of the line to Sucre a loan of $4,000,000 to $5,000,000 will probably be negotiated, the rate suggested being 6 per cent interest with 2 per cent annual amortization. Various taxes will, it is stated, be assigned for the service of this loan, including those on pepper, hides, and cattle. In addition, the Departments of Chuquisaca and Potosi have each agreed to provide 50,000 bolivianos ($19,465) for the loan service. In the event of the completion of the line to Sucre it is hoped that it will be possible to continue the road northeastward to Santa Cruz (population 20,000), center of the rich Santa Cruz Department.

PROJECTS UNDER CONSIDERATION.

Negotiations have been entered into at various times for the further extension of the Potosi-Sucre Railway to Puerto Suarez, on the Paraguay River. The concession at latest accounts was controlled by an Italian syndicate, the Fomento de Oriente Boliviano. The length of the line, which has been partly surveyed, will be between 425 and 450 miles, and its cost would probably slightly exceed $10,000,000. The Bolivian Government has agreed to guarantee a certain percentage on a portion of the construction cost. Puerto Suarez, which is the outlet for fair amounts of rubber and hides, is located opposite Corumba, Brazil, to which port the Brazilian Government has under construction a line of railway. In the event of the possible construction of these two lines and of the completion of the Bolivian Government lines, Santa Cruz to Sucre and Sucre to Potosi, a through transcontinental route, somewhat lengthy, would be open for such traffic as might develop. The rail distance to Rio de Janeiro would be approximately 1,900 miles. A number of years will probably elapse before these various undertakings will be fully carried out.

Another project is for the construction of a line from Yacunda, on the Argentine frontier—between which point and the town of Embarcacion the Argentine Government is constructing a railway—northward to Santa Cruz, tapping the oil country as well as other important, although little developed, sections of the country. This line would approximate 250 miles in length and would encounter some difficult grades. Concessions have been granted by the Government for the line's construction, and much of the route has been surveyed. Years will probably pass before it will be constructed. A line has been surveyed from La Quiaca, on the Argentine frontier (terminus of its Government line), to Tarija, Bolivia, which is a town of some importance and the center of an agricultural area of great fertility. The length of this line would probably not exceed 125 miles.

The Bolivian section of the Madeira-Mamore Railway, constructed in part as a means of routing traffic around the falls and rapids in the Madeira and Mamore Rivers, will probably not be built at the present time, owing to the receivership of the railway company. Its terminus in Bolivia was to have been at Riberalta, on the Rio Madre de Dios.

PUBLIC UTILITIES.

Public-utility development in Bolivia has been confined mainly to the larger cities. Electric lighting has been installed in perhaps a dozen of the more important places, and water systems have likewise been established in various localities. In addition to the interurban electric railway terminating at Cochabamba, there is one other tramway line in the Republic—namely, that operated by the Bolivian & General Enterprise Co. (Ltd.) at La Paz.

The Bolivian & General Enterprise Co. controls and operates the tramways, electric-lighting system, and telephone service at La Paz. The company, which is owned almost wholly by the French munition-making firm of Creusot & Schneider, was originally incorporated for the purpose of exploiting and developing rubber in far eastern Bolivia. Following the collapse of the rubber boom this concern obtained the public-utility franchises in La Paz. Power is obtained without difficulty from the river that flows down from the Alto. The tramway line, single track with sidings for passing purposes, runs from the railway station on the outskirts of the city to the main plaza, thence down the heavy grade to the Parado or residential section. The line is approximately 3 miles in length, and 8 cars, all of American manufacture, are in regular use. The local first-class fare is high, 0.20 boliviano (8 cents), and the second-class rate is 0.10 boliviano (4 cents). The cars do not seem to be heavily patronized. The cost for electric service, especially for cooking, is said to be excessive, and as a result electricity is used for practically no other purposes than lighting. The telephone service is good and fairly reasonable. No statement of earnings and profits is made public, but it is understood that dividends are not paid on the present capitalization.

The previously mentioned interurban line terminating at Cochabamba is operated by the Electric Light & Power Co. (Sociedad de Luz y Fuerza Eléctrica), of Cochabamba. This light railway, which also radiates through the city, is of 2½-foot gauge, and operates to the towns of Arami, Vinto, Puneta, Tarata, and Cliza. The company also furnishes light and power to Cochabamba and these other towns, and operates a flour mill at Cochabamba. The company has outstanding £300,000 6 per cent preferred stock, guaranteed for 25 years by the Government of Bolivia, and £100,000 common stock.

At Sucre, the nominal capital, the light and power franchise is held by the Empresa de Luz y Fuerza Eléctrica. This company is owned, practically in its entirety, by an individual. At Oruro a local company, the Empresa de Luz y Fuerza Eléctrica, has the lighting and power privileges. The lighting facilities are used by the municipality and to a limited extent by the general public. Oruro was the second city in Bolivia to install electricity. A mule tramway has long existed in the city, but it is seldom, if ever, used to-day. The telephone system is controlled by an individual firm, Pena & Co. The city of Tarija is lighted by gas and electricity and obtains a supply of good water from Erquis, 6 miles away. Potosi is electric lighted and receives its water supply from 22 of 32 original reservoirs built by the Spaniards in the sixteenth century on the hills above the city.

Other than the above, there has been little development along these lines. Opportunities are said to exist for a holding company to take over and develop the existing properties in Bolivia and, as time goes on, to acquire additional franchises.

THE RUBBER INDUSTRY.

Several years ago it was thought that rubber was destined to be the principal product of Bolivia. The districts adjacent to the Beni and Madre de Dios Rivers were rightly heralded as being Eldorados for the growth and exploitation of this product. Large sums were invested in the field and anticipations of large profits were generally indulged in. The industry was hindered from the start by the scarcity of labor and the somewhat unhealthful condition of the country, as well as by the general lack of transportation facilities. The completion of the Brazilian section of the Madeira-Mamore Railway aided the producers, and much was anticipated from the Bolivian section of the railway, which, it was contemplated, would be built to Riberalta, from which point steamers were to have been run on the navigable rivers of eastern Bolivia. The railway was not completed, however, owing to the receivership of the company, and this fact, combined with the crash in the price of rubber, placed the industry generally in an unfavorable situation. Conditions were made even worse following the declaration of war in Europe. An improvement is being noticed at the present time, and better things may be expected. Some years will probably elapse before prosperity is fully restored.

MINING ENTERPRISES.

Foremost among the industries of Bolivia is mining. The silver hills at Potosi and Oruro furnished vast portions of the hoards of wealth that the galleons of Spain took across the seas. Gold and silver were the only minerals sought in those days, except perhaps a little copper. Fabulous tales have been told of the amounts of ore extracted from the mountain at Potosi during the days of Spanish occupancy. Sufficient forced labor was obtainable to assure the taking out of this ore almost without cost, and vast fortunes were accumulated by many of the conquistadores.

After the independence of Bolivia had been achieved the mining industry gradually fell into a state of decay, from which it did not fully emerge until a few years ago. The land was strewn with thousands of abandoned mines and workings, and such development as was carried on was handled in a haphazard way. The construction of railways into the Republic and the endeavors of a thoroughly enlightened Government gradually put the industry on a firm foundation, and there is every prospect of continued progress.

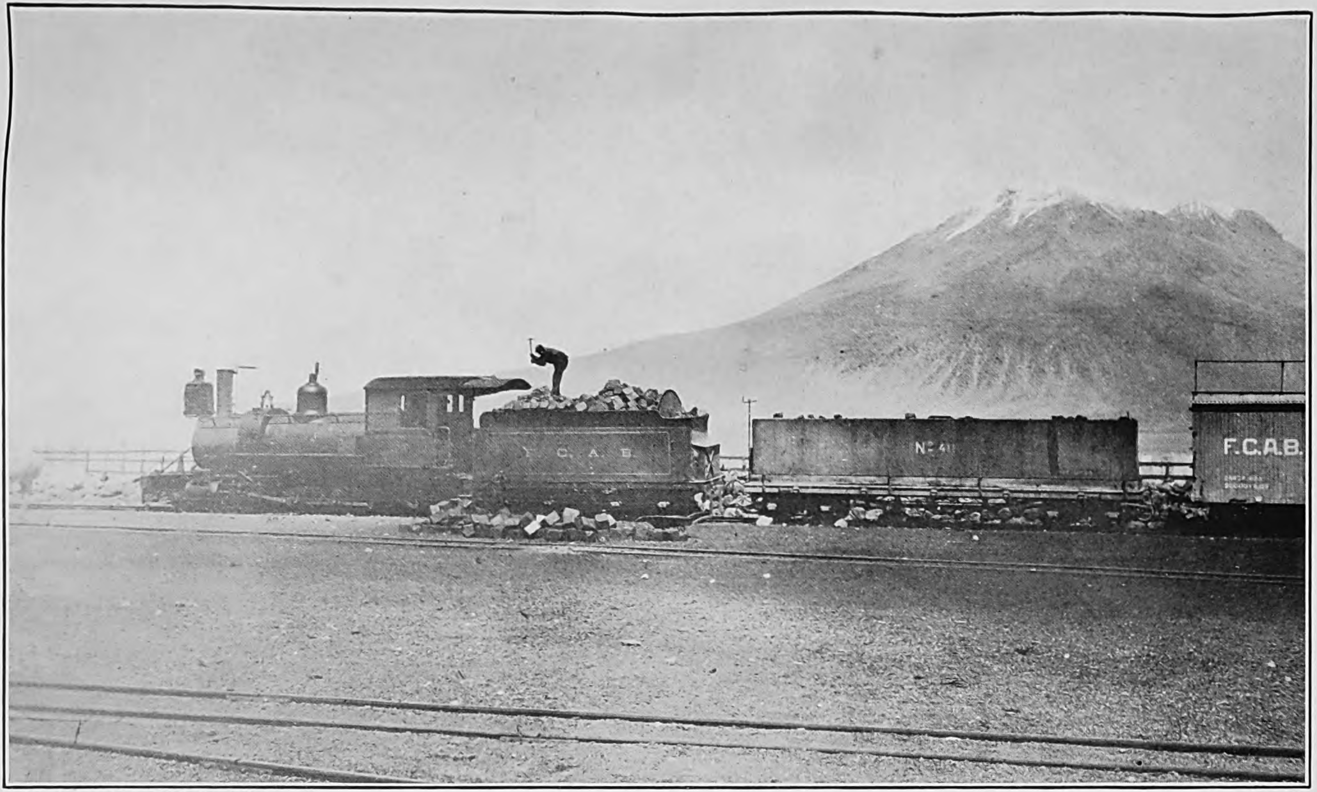
Silver has been displaced by tin as the most important mineral product. A total of 36,482 tons of this valuable mineral was exported in 1915, mostly through the port of Antofagasta; 35,360 tons went to Great Britain and 1,100 tons to the United States. The amount exported in 1915 compares with 35,834 tons exported in 1912 and 35,566 tons in 1909. The Republic stands second in the world in the production of tin, and there are prospects of much greater development following the introduction of somewhat more modern methods and the construction of additional railways and roads. A number of the tin properties are paying well, and there is certainly room for the establishment of other companies, moderately capitalized and managed on a conservative scale. High costs of fuel and transportation are the drawbacks in this as well as other mineral industries in Bolivia. Labor is cheap, good, and fairly plentiful. The better grade of this tin seems to exist in altitudes above 14,500 feet, where working conditions are not so pleasant as on the pampa. Sr. Simon Patiño is the owner of many of the most important of these mines. Details concerning several of the tin mines of Bolivia, their capitalization, etc., will be found in the Appendix (see p. 500). Probably the most important of Sr. Patiño's tin mines are the Uncia properties at Uncia, to which place a railway is under construction, and the La Salvadora mine in the Department of Potosi. The Aramayo Francke properties, hereinafter described, are also of considerable importance. Some American capital has recently been invested in the tin fields, the remainder of the mines being largely held by Bolivian, Chilean, French, British, and Swiss interests. Shares of several of the mining companies are listed on the Santiago (Chile) Stock Exchange.

The tin production of Bolivia during the years 1910 to 1915 has been as follows:

Years.	Metric tons.[1]	Value.	Years.	Metric tons.[1]	Value.
1910	38,548	$14,399,415	1913	44,595	$26,375,245
1911	37,073	20,482,335	1914	37,260	16,529,120
1912	38,614	23,438,985	1915	39,312	19,268,860

[1] Metric ton=2,205 pounds.

Copper, largely found in the Corocoro district, was produced in the year 1915 to the amount of 23,820 tons, the largest production in the history of the Republic. The exportation of this commodity in 1916 was considerably handicapped, owing to the lack of equipment in service on the Arica-La Paz Railway, which was utterly unable to handle this traffic. The Corocoro district has been known for many years, and has been regularly worked since 1873. In 1909 a large number of the properties were consolidated as the Corocoro United Copper Mines (Ltd.), organized in Great Britain. The rest of the properties are held mostly by the Compañía Corocoro de



Photograph by P. S. Penfield.

FIG. 8.—ANTOFAGASTA & BOLIVIA RAILWAY, AT FRONTIER BETWEEN BOLIVIA AND CHILE.

In the background is Mount Ollague, an active volcano, 19,237 feet high.

Bolivia, organized in 1873. A short time ago the Andes Copper Co., a subsidiary of the Anaconda Copper Co. (capital, $2,000,000), investigated certain of the developed properties at Corocoro. The offering price, said to be £1,200,000, was considered too high, and the American concern abandoned the field for the time being to investigate certain properties located near Arequipa, Peru. Copper formations in the Corocoro district are said to resemble greatly those of the northern Michigan copper mines, such as Calumet & Hecla, Copper Range, and other well-known properties. Most of the copper exported from Bolivia in 1915 went to the United States. The total value of the copper produced in 1915 was $3,820,821, as compared with $1,728,441 in 1914, $1,278,870 in 1913, $1,318,745 in 1912, $555,230 in 1911, $695,312 in 1910, and approximately $500,000 in 1901. The principal fuel used at the mines is taquia, which sells ordinarily at about $4 per ton, but which, owing to the abnormal demand, has risen to about $7. The daily wages paid to native employees is approximately 1.80 bolivianos to the men and 0.70 bolivianos to the women.

The tungsten deposits of Bolivia have attracted considerable attention of late. About 793 tons of this valuable mineral were exported in 1915, as compared with 276 tons in 1914. The United States is the best customer for this commodity. The ore is found in widely scattered areas, although most of the development has taken place in the Santa Cruz district, lying to the northwest of Cochabamba. There is likewise some development in the neighborhood of Uyuni. The stated production for 1915 was valued at $293,462.

Antimony was exported to the amount of 17,923 tons in 1915 and in very large amounts during 1916. Only 186 tons were exported during 1914. The value of the 1915 production, given as 13,085 metric tons (less than the amount exported), was $4,216,059, as compared with only $11,913 in 1914. The business in this commodity may be said to be only temporary, the ruling high prices being due to the abnormal demand caused by the European war. In normal times exportation is hindered by the high transportation rates.

Silver, as has been stated previously, has been declining in production in the Republic of Bolivia. The recent rise in the price of the commodity has brought a slight, temporary increase in the value of the production. During the days before the formation of the Republic, Bolivia was the richest silver country in the world. The famous Cerro Rico de Potosi produced in bygone days more than $2,000,000,000 in wealth—the greatest production of any similar area in the entire world. It is further claimed that the mineral riches of this silver mountain are far from exhausted. From 1900 to 1910 the silver production of Bolivia dropped steadily, from upward of $5,000,000 per annum to approximately $2,100,000, and from 1910 to 1915 the production declined about one-half, the total for 1915 reaching $1,092,647.

Gold mining has not assumed importance in Bolivia. The Department of La Paz at the present time produces most of the gold mined in Bolivia, although it is known to exist in the Departments of Potosi, Chuquisaca, Cochabamba, and in the Velasco province of the Department of Santa Cruz. In all, 398 pounds were exported during 1915 and 393 pounds during 1914. The value of the 1914 production was $118,695.

DISTRIBUTION OF BOLIVIA FIELDS.

The petroliferous fields of Bolivia, situated in the Andean district, lie along the southeastern frontier of the country, and indications are quite continuous in a belt extending northwest and southeast through a distance of 150 miles (241 kilometers) as far as the Argentine boundary at Yacuiva. The zone is a diagonal one, traversing the eastern Provinces of Santa Cruz, Sucre, and Tarija, between 63° and 64° west longitude and 19° and 22° south latitude. According to M. A. Rakusin in the "Troudi" of the Grosny branch of the Russian Technical Society, published in 1913, there are at least three fields, viz: (1) Piema, (2) Kuarazuti, and (3) Lomas de Ipaguaciu. The productive formations are supposed to extend from near Santa Cruz in the center of Bolivia, southward through Sauces to Piquirenda, Plata, and Guarazuti, in the Province of Tarija and into northern Argentina.

According to the Pan American Bulletin, "careful geologic investigations of the eastern slope of the Bolivian Andes confirm the claim that a petroleum belt exists along the entire range of these mountains from Ayacuiba to the Madre de Dios River."

The Pan American Bulletin mentions a narrow belt in eastern Bolivia, on the foothills of the Cordillera Real, "extending in the direction of Santa Cruz, to the village of Monte Agudo, a distance of some 300 miles." Indications are also reported in the Beni district. In view of the cumulative evidence, it seems likely that Bolivia will some day be a great producer of petroleum.

The existence of oil has long been known from seepages, and recently these have been found to occur continuously along a belt extending northwest-southeast, over 150 miles, down to the Argentine boundary at Yacuiva. Thus the petroliferous zone extends diagonally across the Provinces of Santa Cruz, Sucre, and Tarija, between 63° and 64° west longitude and 19° and 22° south latitude, and thence far into Argentina.

A report made by Director General Barrett, of the Pan American Union, states that the Espeljos (Mirror) Spring, 36 miles from Santa Cruz, is a fair sample of the character and kind of surface indications in the region between the northern boundary of Argentina and the Madre de Dios River in northern Bolivia. This river is close to the southern boundary of western Brazil, and with the Beni, into which it runs, finally joins the Mamore River to form the Madeira.

GEOLOGICAL CONDITIONS.

The oil along the eastern base of the Andes in Bolivia comes, according to Ralph Arnold, chiefly from Lower Cretaceous dolomites. The formations are much folded and faulted. According to Rakusin, the three principal petroliferous areas in southern Bolivia belong to the so-called "Sistema de Salta," extending from northern Argentina into the center of Bolivia. The strata are of the chalk formation, and, according to him, "all the most important petroliferous areas of South America must belong to the chalk formation, with the single exception of the petroliferous deposit of Cacheuta Mendoza, which belongs to the Upper Trias."

According to the same writer, the oil seepages at Peima are found in two conglomerate horizons separated by clay slates, and similar conditions are said to exist in Kuarazuti. The deposits of Ipaguaciu seem to be different, however. "An anticlinal of average depth" exists in the Peima fields, and the Kuarazuti structure is reported as a continuation of the folds a few miles distant and identically the same. It is reported that the probable thickness of overlying strata in the southeastern Bolivian fields ranges from 160 to 660 feet (48.7 to 201 meters). If this be true, the cost of development may be correspondingly small. No wells have been sunk in this neighborhood, and investigations have gone no further because of the inaccessibility of the localities. According to Arnold, "springs and seepages of oil issue from Lower Cretaceous dolomites along the eastern base of the Andes." The Bulletin of the Pan American Union says that "extensive petroleum deposits of good quality have been discovered at Calacota, on the Arica & La Paz Railway." If true, this shows a continuation of the Titicaca fields of Peru.

QUALITY OF BOLIVIAN PETROLEUM.

Little is known of the quality of Bolivian petroleum, but some analyses show an extremely high percentage of lubricating substances. The oils so far recovered vary in composition from those of asphaltic base with specific gravity of 0.975 (13.5° Bé.) and containing 4 per cent gasoline to an oil of 0.810 specific gravity (43° Bé.) containing 40 per cent gasoline. The heavier oil is confined in the lower sands. Along the eastern base of the Andes the petroleum is of high grade, from 35° to 47° Bé.

According to the Pan American Bulletin, in reference to the petroliferous belt from Ayacuiba to the Madre de Dios River, "the Espejos petroleum spring, 12 leagues from Santa Cruz, is a fair sample of the quality of petroleum encountered in the belt referred to. Oozings taken from the surface flow of this spring, according to the recent analyses made in London, contain 78.2 per cent of kerosene, 17.5 per cent of lubricating oil, and 4.3 per cent of coke. No shafts have been sunk in this neighborhood, but the indications would seem to argue that gushers may be found by boring to the proper depths. Up to the present time the Espejos spring remains unexploited."

Pools of relatively pure oil and also of "pitch" exist in eastern Bolivia, on the foothills of the Cordillera Real. These indications extend in the direction of Santa Cruz to the village of Monte Agudo, a distance of some 300 miles (482 kilometers). This oil-bearing belt appears to be comparatively narrow. Similar indications are reported in the Beni district, but they are less well known.

REMARKS ON GENERAL CONDITIONS.

No oil has yet been produced in Bolivia, and the transportation difficulties have been cited as an argument that oil is not likely to be produced in the near future. The only way of reaching the Santa Cruz region at present is by cart road across Bolivia or Argentina. Two railroads are projected to the fields, however, one to run west from the Paraguay River and a second north from the Argentine frontier, and these will tap the oil region.

MANUFACTURING.

As a manufacturing country Bolivia has not made much progress. A few concerns have located there and seem prosperous. There are breweries at La Paz and Sucre, as well as a National Match Factory that holds an exclusive concession from the Government. This concession expires in 1927. There are flour mills at Cochabamba and elsewhere, a shoe factory at Oruro, and a small number of other manufacturing concerns scattered throughout the larger cities of the Republic. There is no doubt that opportunities exist in the manufacturing field, but each individual line must be previously investigated.

FOREIGN CAPITAL INVESTED IN BOLIVIA.

Bolivia seems to have been a favorite field for French investors, who have readily absorbed the external bonds, financed public utilities, and otherwise placed money in the development of the country. Probably France has invested in Bolivia between $20,000,000 and $25,000,000. British investments were recently estimated at $17,519,400; Chile has several millions at stake in the Bolivian mines; while the United States, Germany, and, in a small way, Switzerland have employed capital there. Germany has a large bank there, and numerous German merchants, previous to the war, handled a large part of the country's imports.

BRAZIL.

INTRODUCTION.

The Republic of Brazil is the largest both in area and population among the Latin American countries. Its extent is little realized outside the Republic's own boundaries, its area being equal to that of the United States (excluding Alaska), England, Ireland, Scotland, and Wales, the Netherlands, Belgium, Portugal, and Switzerland combined. The population of Brazil is estimated at more than 23,000,000. It is bounded on the north by the three Guianas, Venezuela, and Colombia; on the west by Colombia, Peru, Bolivia, and Paraguay; on the south by Uruguay and Argentina; and on the east and southeast by the Atlantic Ocean.

Brazil has within its vast area partly developed and undeveloped wealth of every description. It contains forest-covered valleys watered by the greatest chain of rivers in the world, the Amazon and its tributaries; vast stretches of table-land, healthful to live in and highly productive; magnificent mountain ranges, rich with minerals; and fine cities and harbors. With wealth such as the Republic contains, its future can not be otherwise than promising.

There are within the Republic not less than 27,000 miles of navigable rivers and more than 16,000 miles of railway, these highways of commerce affording access to the most exuberant regions of natural wealth, including the great areas producing cacao, rubber, sugar, coffee, fruits, and other agricultural products. The Amazon drains a wider area than the Mississippi, Missouri, Danube, and Nile taken together, and taps the world's greatest forest area. Within or bounding the Republic there are numerous other navigable and important streams. Geographers say that of the 55 largest rivers known to mankind, 33 are wholly or largely in Brazil.

The Republic may be said to be divided into zones, and it possesses a wide variety of climate. On and near the northern frontier is located the Guiana Plateau, a section abounding in forest wealth and known to contain immense areas of open country suitable for cattle raising. However, this territory is at present almost inaccessible and may only be spoken of as a land of to-morrow. In the not distant future a railway that will probably head inland through British Guiana will open this territory to the world; then the ax will swing and cattle will be raised and lumber and meat products will be shipped to the outside markets. This section of Brazil is destined, in fact, to become one of the great cattle ranges of the western world.

To the southward of the Guiana Plateau is the great Amazon Valley, containing the king of rivers with its great array of tributaries. To all appearances this country is merely a wilderness, yet in normal times hundreds of thousands of tons of products descend the river each year, being sent to Manaos or Para to be shipped to the outside world. This traffic represents the toil of a handful of men working in a territory hardly explored. Only the surface of the district has been touched; in fact, were ten times as much of the products of the upper river basin sent out each year, not the slightest impression on the country's resources would be made, so fast do the tropical products grow. It is a territory of magnificent distances. Manaos, the important city of the central Amazon, is not less than 924 miles from Para, and there is no town of any real importance between the two places. From Manaos to Loreto, just over the Peruvian boundary, is 889 miles; to Santa Isabel, on the Rio Negro, the distance from Manaos is 423 miles; to Marary, on the River Jurua, it is 1,093 miles, and to Amajas, on the River Purus, it is 1,435 miles.

Southward from the Amazon basin rises slowly the great Central Plateau. In this semitropical region an abundance of sugar is raised, the nation standing sixth in the world as a producer of this commodity. This and the more southerly sections of the Republic contain sufficient hardwood to last the world for centuries, as well as building timber and other wood of every description; yet Brazil has for a long time imported a large amount of timber. Some of the trees measure from 30 to 35 feet in circumference and reach a considerable height. Here and there sawmills are being erected, but the industry is only in its infancy.

Central Brazil contains, among its numerous sources of wealth, minerals of almost every description, as well as agricultural areas. São Paulo, in the south-central section of the country, is the richest coffee-producing land in the world, two-thirds of the entire amount of coffee used annually by mankind being raised in this district. The States of Parana, Santa Catharina, and Rio Grande do Sul contain some of the richest and finest cattle pastures and farm lands in the Western Hemisphere. This section of the Republic will some day be populated by millions of inhabitants and will attract vast amounts of capital.

Brazil has many large cities, some of which are thoroughly up to date and magnificently laid out. Rio de Janeiro, the capital, is credited with 1,200,000 inhabitants, ranking second among the cities of Latin America and fifth in the Western Hemisphere. Rio is located on one of the most beautiful harbors in the world and presents to the eye a most charming picture—one long to be remembered. Around a very large portion of the city's water front a magnificent boulevard of asphalt and white marble and granite has been laid out. Palatial buildings abound, and there are numerous fine parks adorned with beautiful fountains and statuary and luxuriant with tropical and subtropical vegetation. One finds here museums, universities, a beautiful municipal theater, a fine system of tramways, etc. Though it was once none too free from tropical diseases, the city is to-day one of the cleanest and most sanitary in the world, the death rate being as low as 19 per 1,000.

Next to Rio in size and importance comes São Paulo, a city with a population of about 450,000, sometimes called "the Chicago of South America," whose prosperity bids fair at some future date to rival that of the central metropolis of the United States. It is a bright, breezy city, with a most delightful climate, situated on a table-land 2,700 feet above sea level and 49 miles distant from the port of Santos. It possesses wide streets, a palatial opera house (equal in beauty to any in the two Americas), theaters, public buildings, shops, etc., a good tramway and electric lighting service, and a wide variety of modern conveniences.

Bahia, a city largely rebuilt and with perhaps 300,000 inhabitants; Pernambuco (population over 200,000), and Para, the port of outlet for the Amazon River, are next in size among Brazilian cities, and they are followed (although not in order of size and importance) by Santos, Manaos, Rio Grande do Sul, Porto Alegre, Parahyba, Nictheroy, and Ceara.

Brazil's foreign trade reached its zenith in the year 1912, when imports and exports totaled $670,111,140. In 1913 there was a decrease to $639,653,589, and in 1914 to $387,285,717. The totals for 1915 and 1916 were $401,407,850 and $460,383,964, respectively.

PUBLIC DEBT OF FEDERAL GOVERNMENT.

The total public debt of the Republic of Brazil during the past four years has been as follows:

(*a*) *Sterling debt.*—Sterling funded debt, 1913, £103,773,000; 1914, £104,481,000; 1915, £108,629,000; 1917 (May 1), £112,904,000. Sterling floating debt, 1913, £2,037,000; 1914, £2,311,000; 1915, £4,044,000; 1917 (May 1), £1,456,000.

(*b*) *Paper money.*—The amount of paper money in circulation as of May, 1917, was 1,157,528,000 milreis, as compared with 601,488,000 milreis in 1913 (milreis equals about $0.26 United States currency at present rate of exchange).

(*c*) *Internal funded debt.*—The internal debt of Brazil as of May, 1917, amounted to 864,436,000 milreis, as compared with 726,746,000 milreis in 1913.

(*d*) *Internal floating debt.*—The internal floating debt of Brazil as of May, 1917, amounted to 41,087,000 milreis.

PRINCIPAL EXTERNAL ISSUES.

The principal external loans of Brazil are the following:

(*1*) *4½ per cent bonds of 1883.*—Coupons due June and December; sinking fund, 1 per cent, cumulative; original price, 89; price January, 1918, 65; high since 1911, 103; par of bonds, £100, etc.; original issue, £4,599,600; outstanding, £2,713,100. The coupons due December, 1914, to June, 1917, inclusive, were paid in funding bonds (see a following paragraph).

(*2*) *4½ per cent bonds of 1888.*—Coupons due April and October (see note on p. 121); sinking fund, 1 per cent, cumulative (see note); original offering price, 97; high price since 1910, 103; price January, 1918, 64½; par, £100, etc.; original issue, £6,297,300; outstanding, £4,173,100.

(*3*) *4 per cent bonds of 1889.*—Coupons April and October (see note); sinking fund, one-half per cent, cumulative (see note); originally issued in 1889 to provide for the conversion and redemption of former issues of 5 per cent bonds; high since 1911, 91½; price January, 1918, 59; par, £100, etc.; original issue, £19,837,000; outstanding, £17,468,300.

(*4*) *5 per cent bonds of 1895.*—Coupons February and August, payable in London, Paris, Amsterdam, Brussels, and Hamburg (see note); sinking fund, 1 per cent, cumulative (see note); original price, 85; high since 1911, 103½; price January, 1918, 72½; par, £100, etc.; original issue, £7,442,000; outstanding, £6,925,900.

(*5*) *5 per cent funding bonds.*—Coupons quarterly, January, April, July, and October; par, £20, £100, etc. This issue was brought out 1898 to 1900 to fund coupons on the then existing bonds. The cumulative sinking fund of one-half per cent per annum continued to operate and interest was paid regularly during the period July, 1914, to end of three-year funding period on various issues (see note). The bonds are secured on customs receipts of Rio de Janeiro. The high price for the issue since 1910 was 105½, and the price January, 1918, was 95. The original issue was £8,613,700, of which £8,338,940 remains outstanding.

(*6*) *Railway guaranty rescission bonds.*—Par, £20 to £1,000; interest January and July (see note); sinking fund, one-half per cent per annum and an additional sinking fund (payable under certain conditions) derived from certain funds of the railways; bonds issued 1901 to 1905 to acquire certain railways; high price since 1911, 89¼; price January, 1918, 57; original issue, £16,619,300; outstanding, £12.935,480.

(*7*) *5 per cent bonds of 1903.*—Par, £100, etc.; interest May and November, payable in London, Paris, Brussels, Hamburg, and Amsterdam (see note); sinking fund, 1½ per cent, cumulative (interest and sinking fund have been regularly met); original offering prices, £5,500,000 in 1903 at 90 and £3,000,000 in 1905 at 97; high price since 1911, 105; price January, 1918, 84; original issue, £8,500.000; outstanding, £7,698,100; secured by net revenue of the port of Rio de Janeiro.

(*8*) *5 per cent bonds of 1908.*—Par, £100, etc.; interest January and July, payable in London, Paris, and Amsterdam (see note); sinking fund was to have retired issue by 1918, but in accordance with the funding scheme of 1914 (see note), arrangements were made whereby the sinking fund operations would not recommence for 13 years. so that issue will not be extinguished until 1930; original offering price, 96; high since 1911, 103¼; price January, 1918, 72; original issue, £4,000,000; outstanding, £1,839,400.

(*9*) *4 per cent bonds of February, 1910.*—Par, £100, etc.; interest February and August (see note); sinking fund, ½ per cent, cumulative (see note); original offering price, 87½, or issued at 87½ per cent for conversion of Western of Minas Railway 5 per cent bonds, as well as for the 5 per cent Government bonds of 1907; balance of proceeds used for railway construction; high since 1911, 88½; price January, 1918, 58; original issue, £10,000,000; outstanding, £9,767,500.

(*10*)· *4 per cent bonds of March, 1911.*—Par, £100, etc.; issued for the construction of the Rio de Janeiro port works; coupons payable March and September in London, Brussels, Antwerp, Paris, and Amsterdam (see note); sinking fund was to have retired issue between 1913 and 1927; final maturity date changed from 1927 to 1940, in accordance with funding scheme of 1914 (see note), sinking-fund payments having been suspended for 13 years; original price, 92; high since date of issue, 95⅝; price January, 1918, 64; original issue £4,500,000; outstanding £4,042,900.

(*11*) *4 per cent bonds of December, 1911.*—Par, £20 and £100; interest January and July, payable at Lloyd's Bank, London; issued to provide funds for the construction of railways in the States of Ceara and Piauhy; sinking fund was to have retired issue by 1972, but the suspension of payment dates for 13 years will delay maturity; original price, 83½; high since issue, 83½; price January, 1918, 58; original issue, £2,400,000; outstanding, £2,400,000.

(*12*) *5 per cent loan of 1913.*—Par, £20 to £1,000; interest April and October (see note), payable in London, Paris, Basel, Amsterdam, and Brussels; sinking fund, 1 per cent per annum, cumulative (see note); bonds issued for the construction or enlargement of the ports of Pernambuco, Corumba, and Paranagua, for railway construction, and for retirement of Treasury bills; original price, 97; high price since date of quoting on the London Stock Exchange, 93½; price January, 1918, 71; amount of bonds issued and outstanding, £11,000,000.

(*13*) *5 per cent funding bonds of 1914.*—Interest quarterly commencing February (regularly paid in cash); sinking fund, ½ per cent per annum, cumulative (commencing August 1, 1917); issued as per funding scheme of 1914 (see note) to meet interest on various issues as specified above for three years commencing August 1, 1914; secured by customs receipts of various ports; authorized issue, £15,000,000; issued, £9,962,229 (to May, 1917; amount presumably slightly increased); price January, 1918, 81.

[NOTE.—The funding scheme that went into effect August 1, 1914, and continued in effect until July 31, 1917, provided for the funding into 5 per cent bonds (as above) of the coupons on all bond issues with the exception of those heretofore specified, namely, 5 per cent funding bonds of 1898 and the 5 per cent secured (customs receipts) loan of 1903. Sinking-fund operations on all the loans, with the exception of the 5 per cent funding bonds of 1898, were also discontinued for the period of 13 years. In addition to the loans specified in earlier paragraphs, the Government's Lloyd Brasileiro (steamship) loans were also affected by the scheme; see following paragraphs.]

GOVERNMENT LLOYD BRASILEIRO LOANS.

5 per cent sterling loan.—Interest April and October (see note above); sinking fund was declared payable in 12 annual drawings which would have retired entire issue by December, 1916, but under funding scheme of 1914 (see note above) final maturity date has been delayed until 1927; original issue, £1,100,000; outstanding, £210,500. The issue is guaranteed as to interest and sinking fund by the Republic of Brazil. The original offering price of the issue abroad was 96. The price January, 1918, was about 80.

4 per cent sterling loan of 1910 (*Lloyd Brasileiro*).—Interest April and October (see note concerning funding scheme of 1914); redeemable at par by 12 annual drawings which were to have commenced in October, 1916, but have been delayed until 1927 in accordance with the funding scheme of 1914; original price, 90; high price since issue, 97; price January, 1918, 65; issue guaranteed as to principal and interest by the Republic of Brazil; amount originally issued and at present outstanding, £1,000,000.

STERLING FLOATING DEBT.

The sterling floating debt was in the form of treasury bills, which were accounted for as follows:

Issued at London	£3,191,800
Issued at Rio de Janeiro	1,636,552
Due Rio Grande & São Paulo Railway	199,564
Total issued	5,027,916
Total paid off	3,571,546
Balance outstanding	1,456,370

It is interesting to note that the first external loan of the then Empire of Brazil was made in the year 1824, when, under date of August 13, £1,333,300 5 per cent bonds were sold at 75 per cent, the issue to be retired by sinking fund within 30 years. The following month saw the issue of another loan to Brazil, this being for the sum of £2,352,900, bearing interest at 5 per cent and to be retired in 30 years. The price obtained was 85. In 1829 another loan was contracted abroad, the principal being £769,200, and the interest rate, as before, 5 per cent. The issuing price of this 30-year loan was much lower than that of previous issues, being 52 per cent.

In the year 1839 (there had been an intermission of 10 years between the issuance of external loans) £411,200 5 per cent bonds, to mature in 30 years from 1846, were floated abroad at 76 per cent. In 1844 a 29-year loan totaling £732,600 realized 85 per cent. In 1852 the next loan was floated, the amount being £1,040,600, the final maturity date 1882, the interest rate 4½ per cent, and the price 95½. A 20-year 4½ per cent loan was floated six years later, the price again being 95½, and a 5 per cent loan was negotiated in 1859 at par; the total amounts represented by the two issues being £1,528,500 and £508,000, respectively.

During the period between 1859 and the date of the first issue now outstanding (1883) several important loans that have since been retired were floated, the interest rates being 4½ and 5 per cent and the prices 74 (5 per cent loan of 1867) to 96½ (5 per cent loan of 1875). The 5 per cent loan of 1867 was for the largest amount thus far floated, £6,963,600. The 1875 loan was for £5,301,200, and other loans were for amounts varying from £1,373,000 to £3,855,300.

In addition to the loans at present outstanding, loans that have since been retired were issued as follows: £6,431,000 5 per cent bonds of 1886; £3,710,000 5 per cent bonds of 1893 (issued at 80 per cent).

External bonds outstanding at the present time represent very extensive expenditures for public works on the part of the Government. The improved condition of the nation's finances and the announcement that all interest will be paid in cash hereafter has generally improved the prices and standing of the bonds on the markets abroad. All the issues are listed in London, and several in Paris and elsewhere. Those actively quoted in Paris include the 4 per cent bonds of 1899, 5 per cent funding bonds of 1898, 5 per cent of 1908–9, 4 per cent of 1910, etc.

INTERNAL DEBT.

As has previously been stated the internal funded debt of Brazil, as of May, 1917, amounted to 881,993,700 milreis. As of December

31, 1916, the total internal funded debt in circulation (864,436,400 milreis) had been issued for the following purposes:

	Milreis outstanding.
Currency bonds ("apolices geraes") 5 per cent and 4 per cent (mostly 5 per cent)	515, 145, 600
Port works of Rio de Janeiro (issued 1903)	17, 300 000
Bonds for purchases of railways	231, 367, 000
Bolivian indemnity, 5 per cent	1, 629, 000
Lloyd Brasileiro steamship	671, 000
Treasury obligations	65, 429, 800
Public works State of Rio de Janeiro	13, 841, 000
Miscellaneous	19, 053, 000
Total	864, 436, 400

These bonds are actively quoted in Rio de Janeiro. Interest on the principal issues is payable January and July. Some of the other issues bear interest at as high a rate as 6 per cent. The following table indicates the quotations on principal issues:

Issues.	Rate.	Outstanding.	Price April, 1917.
	Per cent.		*Milreis.*
"Apolices Geraes," 5 per cent (currency bonds)	5	512,414,600 milreis	810
"Apolices Geraes," 4 per cent (currency bonds)	4	119,600 milreis	780
National issue of 1903	5	17,300,000 milreis	798
Issue of 1909	5	20,000,000 milreis	795
Issue of 1910 (1)	5	31,182,000 milreis	
Issue of 1910 (2)	3	1,544,000 milreis	
Issue of 1911 (1)	5	29,999,000 milreis	790
Issue of 1911 (2)	5	4,997,000 milreis	780
Issue of 1912 (1)	5	49,998,000 milreis	795
Issue of 1912 (2)	5	17,742,000 milreis	800
Issue of 1913 (1)	5	29,890,000 milreis	
Issue of 1913 (2)	5	1,816,000 milreis	
Federal Railway bonds 1908 (500 francs)	5	100,000,000 francs	700
Federal Railway bonds 1910 (500 francs)	5	100,000,000 francs	
Federal Railway bonds 1911 (500 francs)	4	60,400,000 francs	
Federal Railway bonds 1911 (£20)	4	2,000,000 pounds sterling	
Port of Recife	5	40,000,000 francs	

NOTE.—The bonds of the above issues, with the exception of those expressed in foreign currency, have a par value of 1,000 milreis (1,000$).

The internal funded debt of Brazil had its origin following a decree dated 1827. Between the years 1828 and 1882 "apolices" ("apolices" is a term for consols) were issued, bearing interest at 6 per cent per annum, to the amount of 339,675,100 milreis, of which 22,977,700 milreis were paid off. The rest were, in a later year, converted into 5 per cent bonds. In addition, three internal gold loans—30,000,000 milreis in 1868 at 6 per cent, 51,885,000 milreis in 1879 at 4½ per cent, and 109,694,000 milreis in 1889 at 4 per cent—were issued and subsequently paid off.

INTERNAL FLOATING DEBT.

The internal floating debt, as stated, amounted in May, 1917, to 41,087,000 milreis, this being in the form of treasury bills. It is said that sufficient resources are at hand to bring about the retirement of this entire issue, together with the £1,456,000 external floating debt heretofore mentioned. It will thus be seen that Brazil, through economies and by other approved methods, is taking effective steps to clear off the nation's floating debt and prevent a recurrence of any financial crisis such as shook the country during the early months of the European war. The war, unfortunately for the country, followed close on a period of unusual depression, which had been due to overexpansion caused by the almost too rapid growth and development of the various States of the Republic and by the crash in rubber prices. The President in his message to Congress dated March 3, 1917, stated that all the treasury payments were up to date except those dependent upon a legislative credit and those that had not been requested by the creditors themselves. After dealing with all current expenses the national treasury had been able to accumulate gold reserves to an amount in excess of £3,000,000, making a total sum of more than £5,000,000 gold at the disposal of the Government to meet obligations.

The steps taken by the Government to reestablish normal conditions has had a very marked effect upon the currency of the country generally, and exchange rates have steadily risen.

STATE ISSUES.

The various States of Brazil, as distinct from the Federal Union, have the power to raise loans on their own account. A large number of the municipal loans, having been issued to carry out important public works, bear the guaranty as to principal and interest of the various State governments. Practically all of the guaranteed loans and a number of other loans have been floated in European markets and prior to the war were in favor with investors.

The following paragraphs describe briefly some of the important external State issues of Brazil.

STATE OF ALAGOAS.

The external debt of the State of Alagoas consists of an issue of 5 per cent bonds originally publicly offered to the amount of £500,000. Of this issue of £500,000, £220,000 was offered for subscription in Paris in 1906, and the rest was mostly offered in London in 1909 at 85 per cent. The highest price for this issue in London since the year 1911 was 95 and the price January, 1918, was about 70 per cent. The loan is specifically secured by income derived from customs duties and is generally guaranteed by the entire revenues of the State. The loan is being retired by an annual sinking fund, which either buys in the open market at below par or draws bonds at that figure. The entire issue is to be retired through this sinking fund by 1958. The income from export duties has varied annually between £52,460 and £78,646, interest and sinking-fund requirements amounting to £27,500 per annum. Approximately 10 per cent of the issue has been retired through the sinking fund.

The area of Alagoas is 22,583 square miles and the estimated population 1,000,000.

In addition to its external loan, the State has outstanding 400,000 milreis 5 per cent bonds in 1,000-milreis denominations, the interest being payable January and July.

STATE OF AMAZONAS.

In the year 1906 the State of Amazonas floated a loan for 84,000,000 francs at 5 per cent per annum, interest payable May and November. The bonds were sold in Paris, Antwerp, and Brussels, mostly at 91 and were secured by the revenues from export duties on rubber, by the lease of the Manaos lighting and tramways concession, and by a special lien on the "patente" tax. The sinking fund was one-half per cent, cumulative, per annum. A recent quotation for the bonds on the Paris Bourse was 260 francs per 500-franc bond.

Figures concerning the internal debt are not available. Prior to the war it was stated that the total internal debt amounted to 15,000,000 milreis and the floating debt to 18,975,794 milreis.

The estimated population of Amazonas is 460,000. Manaos (population 65,000) is its capital.

STATE OF BAHIA.

On several occasions the State of Bahia has been a borrower in the markets of Europe, particularly in France and Great Britain. In the year 1888, 20,000,000 francs of 5 per cent bonds were floated in Paris at 96 per cent. In 1905 a new loan was created to the amount of £1,613,800, under which bonds were either reserved to retire bonds under the loan of 1888 or were exchanged for them. The 1888 loan has since been reduced to approximately 9,000,000 francs.

In addition to the bonds reserved for or issued in exchange for the 5 per cent bonds of 1888, £500,000 was issued for the consolidation of the floating debt and other internal obligations of the State. The total amount of bonds issued is £1,062,360, of which £998,640 remains outstanding. The coupon due November, 1914, was not paid and arrangements were made whereby this coupon and subsequent coupons were to be funded. The high price of this issue since 1911 was 101 and the low price (1916) was 44. The price January, 1918, was about 70.

The sinking fund, which operates under normal conditions, is one-half per cent per annum. The service is secured by the export duty on tobacco, cacao, and coffee.

In 1910 an issue of 45,000,000 francs bonds was authorized, bonds to be issued in Paris and interest to be payable at the Banque de Paris et des Pays Bas. The bonds are quoted on the Paris Bourse. Under normal conditions the entire issue was to have been retired through sinking fund prior to 1966.

A 5 per cent gold loan to the amount of £1,000,000 was floated in London during 1913, having been offered for public subscription at 93. The proceeds of the issue were assigned to take care of maturing Treasury bills (£400,000), payment and consolidation of floating debt, etc. The sinking fund is ½ per cent per annum, cumulative, and interest dates are January and July. The industrial, professional, and land-transfer taxes were assigned for the service of the issue. The parity of bonds is £20 to £500.

In January, 1915, it was announced that on account of the crisis resulting from the European war the State would be unable to meet interest requirements in cash, but that plans would be made whereby coupons for the period of three years (or, in other words, to and including January, 1917) would be funded. The funding bonds to be issued (see next paragraph) were to bear interest at 5 per cent per annum. The high price for this issue since original date of listing on the London Stock Exchange was 88, the low price was 30 per cent, and the January, 1918, price was about 60 per cent.

The 5 per cent funding bonds were quoted January, 1918, at about 72. The issue is a first charge on certain taxes and is to be redeemable commencing 1918 by a sinking fund of 2 per cent per annum, cumulative, to purchase bonds at or below par or to draw them at the latter figure. The amount outstanding in January, 1918, was £207,000.

The State has in circulation 17,556,000 milreis 5 per cent internal bonds, which are listed on the Stock Exchange at Rio de Janeiro. Interest dates are January and July.

STATE OF ESPIRITO SANTO.

Thrice within recent years the State of Espirito Santo has been a borrower in the French market, the dates being 1894, 1907, and 1908. The 1894 loan was for 17,500,000 francs; the 1907 loan amounted to 25,000,000 francs, to be paid off prior to 1950 by means of a ½ per cent sinking fund (original offering price was 97½, the bonds being publicly offered by two French banks); the 1908 loan was for 30,000,000 francs, to be paid off by 1949 by means of a ½ per cent cumulative annual sinking fund (original offering price in Paris was 95). The bonds of the three issues bear interest at 5 per cent per annum and were issued in 500-franc denominations. Of the 30,000,000-franc issue, 29,490,893 francs remained outstanding May 1, 1917. These bonds are listed on the Rio de Janeiro Stock Exchange, as are the bonds of the issue of 1894.

The State of Espirito Santo also has outstanding an issue of 5,650,700 milreis 6 per cent bonds, interest payable January and July. The quotation for these bonds as of May 1, 1917, was 730 milreis per 1,000-milreis obligation. Of this issue, 1,687,400 milreis bonds were brought out in 1888 and the remainder in 1909 and 1910. The bonds are perpetual, having no maturity date.

STATE OF MARANHÃO.

The State of Maranhão has outstanding both external and internal bonds, the former issued in 1910 to bear interest at 5 per cent per annum and quoted in Paris. This loan was for 20,000,000 francs, bonds being issued in 500-franc denominations. The final due date is 1942. The 500-franc bonds were quoted at 255 francs on the Paris Bourse several months prior to the writing of this report. After the payment of the July, 1914, coupon the payment of further cash coupons was delayed owing to the war.

Before the outbreak of the war the internal debt of this State was estimated at 2,646,200 milreis, being mostly in the form of 5 per cent and 6 per cent "apolices" (consols).

STATE OF CEARA.

The State of Ceara has not been a large borrower abroad. Its only external loan is for 15,000,000 francs, bearing interest at 5 per cent per annum. The issue was floated in 1910 and will mature 1948, the interest being payable May and November and the parity of bonds being 500 francs. This issue has been admitted for quotation on the Stock Exchange at Rio de Janeiro. Details at hand would indicate that the State has no internal funded debt.

STATE OF MINAS GERAES.

The principal loans of Minas Geraes have been the following:

Issues.	Par value.	Original issue.
IN FRANC DENOMINATIONS.	*Francs.*	*Francs.*
External 4½ per cent loan	[a] 500	120,000,000
Loan of 1911, 4½ per cent	500	50,000,000
Loan of 1907, 5 per cent	500	25,000,000
Loan of 1896, 5 per cent	500	65,000,000
IN MILREIS DENOMINATIONS.	*Milreis.*	*Milreis.*
Various issues at 5 per cent	1,000	55,141,200

[a] And £20.

A large majority of the franc bonds remain outstanding; toward the close of 1916 the 5 per cent bonds were quoted at 335 francs and the 4½ per cent bonds at 305. At that time cash interest payments were in arrears. The 5 per cent milreis bonds remain outstanding to the amount of 53,641,200 milreis, the 1,000-milreis bonds being quoted in May, 1917, at 802 milreis.

The area of Minas Geraes is 221,950 square miles and the population about 4,500,000.

STATE OF GOYAZ.

The State of Goyaz, fourth in area among the States of Brazil, has a population of approximately 350,000. Its debt (internal) consists of 400,000 milreis 8 per cent bonds dated 1910 and due 1931.

STATE OF MATTO GROSSO.

The funded debt of this State is wholly internal in character. It takes the form of 8 per cent "apolices" or consols, and was largely issued in 1905 and 1908. The area of the State is 532,680 square miles and the population approximately 165,000. A late estimate placed the internal funded debt at 1,450,000 milreis, this figure being presumably somewhat below the present total.

STATE OF PARA.

The State of Para has an area of 443,900 square miles and a population of approximately 700,000. The State has on three occasions during recent years been a borrower in the British markets. These three loans were for the following amounts and bore the following rates of interest:

Date of loan.	Interest rate.	Original amount.	Approximate amount outstanding.
	Per cent.		
1901	5	£1,450,000	£1,339,250
1907	5	650,000	601,380
1910	6	200,000	(a)
1915 (funding)	5	102,400	102,400

(a) Mostly redeemed.

The 5 per cent loan of 1901 was largely issued at 88 per cent. The loan is secured by the export duties and from the general revenues of the State, including railways and waterworks. The sinking fund of one-half per cent per annum, cumulative, was to have retired the issue by 1952, but payments during the war have been suspended, and bonds will not be retired until the close of 1918. Interest for part of the period of the European war was paid in 5 per cent funding bonds at 115 per cent. The high price for bonds of this issue since 1911 was 102, the low price 41, and the price January, 1918, about 61.

The 5 per cent sterling bonds of 1907 were mostly issued at 87 per cent. They are secured by a charge (subject to the £79,426 for the service of the loan of 1901) on the export duties as well as on the revenues of the State, including railways and waterworks. The cumulative sinking fund of 1 per cent per annum was to have redeemed the entire issue within 37 years, but the crisis due to the European war caused the postponement of these sinking-fund payments until the end of 1918. The interest payments were made during a part of the war period in 5 per cent funding bonds at 110 per cent. These bonds sold at 102, and the price January, 1918, was approximately 61.

The £200,000 6 per cent Treasury loan of 1910 was secured by 10 per cent of the export duties and the revenues of the State. The issue was declared retirable at par by a sinking fund which was to draw or purchase bonds. A large majority of the bonds, if not the entire issue, has been redeemed.

The 5 per cent funding bonds of 1915 were issued in lieu of cash coupons to holders of the bonds of 1901 and 1907. The quotation January, 1918, was 70@73.

STATE OF PARAHYBA.

The State of Parahyba do Norte has an area of 28,850 square miles and a population of approximately 525,000. The public debt of this State is practically all held locally, being in the form of an issue of 6 per cent bonds dated 1896. The original issue was for 1,164,600 milreis, of which 295,100 milreis remains outstanding.

STATE OF PARANA.

The State of Parana has outstanding two bond issues held externally. The first of these issues was for £800,000; interest April and October at 5 per cent per annum; sinking fund one-half per cent per annum, cumulative, to retire the issue by 1956. The security consists of export duties. The loan was publicly offered in 1905 by the Ethelburga Syndicate at 83 and is held largely on the European continent, not being quoted on the London Stock Exchange.

The State's second external loan was floated in 1912. The original amount authorized was £2,200,000, of which £1,400,000 is outstanding. The loan is quoted on the Paris Bourse (375 francs per 500-franc bond at close of 1916) and elsewhere on the Continent. The interest rate is 5 per cent per annum, payable April and October.

The internal debt of Parana consists of 44,701 milreis 7 per cent bonds, of an original authorized issue of 6,000,000 milreis bonds, dated 1904. The bonds are quoted on the stock exchange at Rio de Janeiro.

The area of Parana is 85,450 square miles and the population approximately 400,000.

STATE OF PERNAMBUCO.

On two occasions the State of Pernambuco has been a borrower in the European markets. These loans both bear interest at 5 per cent per annum, and the interest dates are January and July. The first issue was for 25,000,000 francs and was dated 1905, the sinking fund being 1 per cent per annum. These bonds were originally offered in Brussels and Antwerp, Belgium, at 92 per cent, and are secured by a first charge on the revenues of the State. Interest has been regularly maintained during the war period, and the bonds averaged in selling price on the Paris Bourse during 1916 about 75 per cent of par.

The 5 per cent loan of 1909 was floated in France, principally in Paris, Lyon, and Marseille. The issuance price was 93, the bonds being secured by a second charge on the revenues of the State, and also by the "patente tax," house tax, and revenue on sewerage and drainage works. The total amount of this loan was 37,500,000 francs, the bonds being issued in 500-franc denominations. Neither this issue nor the 5 per cent bonds of 1915 are quoted in London, Paris being the principal market.

The internal debt of the State of Pernambuco amounts to 21,726,850 milreis. The area of the State is 49,570 square miles and the population approximately 2,200,000, Pernambuco ranking fourth in population among the various States of Brazil.

In addition to being quoted in Paris, Brussels, and other European markets, the 5 per cent bonds of 1905 are quoted on the Stock Exchange at Rio, some of these bonds being held locally.

STATE OF RIO GRANDE DO NORTE.

The State of Rio Grande do Norte floated a loan in Paris in the year 1910, the bonds bearing interest at 5 per cent per annum. Payments have regularly been made on this issue, which was for approximately £350,000.

The internal debt is represented by an issue of 242,000 milreis 8 per cent "apolices" (consols), the outstanding portion of an original issue of 500,000 milreis. The bonds are dealt in on the Stock Exchange at Rio and were quoted in May, 1917, at 640 milreis per 1,000-milreis bond.

The area of Rio Grande do Norte is 22,195 square miles and the population approximately 450,000.

STATE OF RIO GRANDE DO SUL.

Rio Grande do Sul has on various occasions issued internal loans bearing interest at 7 per cent, 6 per cent, and 5 per cent per annum. These issues have been brought out, usually in small amounts, under various dates. They have no stated maturity date. The approximate original issues and the amounts outstanding are shown in the following table:

Bonds.	Original issue.	Approximate amount outstanding.
	Milreis.	*Milreis.*
7 per cent bonds	1,850,000	351,000
6 per cent bonds	4,236,900	4,236,900
5 per cent bonds	768,000	768,000
Total	6,854,900	5,355,900

The 5 per cent bonds were quoted May, 1917, at 75 per cent.

This State has an area of 91,330 square miles and a population of probably 1,500,000.

STATE OF RIO DE JANEIRO.

In 1912 a loan for the State of Rio de Janeiro was floated in Great Britain, the amount being £3,000,000, of which approximately £2,950,000 remains outstanding. The interest rate is 5 per cent, payable April and October, and the sinking fund one-half per cent per annum. The original price of the loan was 96½ per cent, the high price since the bonds were issued on the London Stock Exchange, 94¾, and the price January, 1918, 77. The low price for the issue during the war period was 59. The issue is secured by the whole of the revenues of the State, on a 2½ per cent additional and ad valorem sugar tax, and on the property tax of the city of Nictheroy, the capital of the State. The revenues of the State in 1912, the year of issue, totaled £770,886, the sugar tax £17,625, and the property tax £41,661.

The internal loans of the State are as follows:

Loans.	Original issue.	Amount outstanding.
	Milreis.	*Milreis.*
6 per cent loan	9,500,000	9,500,000
5 per cent loan of 1898	300,000	300,000
4 per cent loan of 1902	20,000,000	16,998,700

The interest dates on the three issues are January and July. Quotations for the 6 per cent loan, as of May, 1917, averaged 440 milreis per 500-milreis bond; the 4 per cent loan (100-milreis bonds) was quoted at 89.

The State of Rio de Janeiro has a population in excess of 1,300,000; the area of the State is 26,630 square miles.

STATE OF SANTA CATHARINA.

In the year 1909 the State of Santa Catharina floated a loan for £468,750 in the European markets; £250,000 of this issue was sold to London bankers, but was subsequently resold in France. Upward of 10 per cent of the issue has been retired through the operations of a sinking fund of 2 to 2⅛ per cent per annum. The issue is secured by a first charge on the taxes on exports and capital. Interest has regularly been met on this issue, and the bonds were quoted late in 1916 at approximately 80 per cent of par.

The State has two internal loans of importance, both issues bearing interest at 5 per cent per annum. The principal of these issues amounts to 696,900 milreis and 2,000,000 milreis.

The area of the State is 28,630 square miles and the estimated population 425,000.

STATE OF SÃO PAULO.

The State of São Paulo, the world's greatest coffee center, has an area of 112,300 square miles and a population of approximately 3,500,000. The area as stated is about equal to that of all New England and New York State combined.

The total external debt of the State amounts to approximately £6,675,000 and the internal debt to approximately 115,000,000 milreis. The interest and amortization of the debt require approximately

£800,000 annually. The State is the owner of railroads (Sorocabana Railway, etc.) to the value of approximately $24,000,000 United States currency, water supply and sewerage property valued at $16,850,000, and buildings at São Paulo, Santos, etc., valued at $22,115,000.

In October, 1888, the State contracted a loan of £787,500 at 97½ per cent, secured by a direct charge on its revenues, redeemable in 37 years by means of a cumulative sinking fund, the final date being 1925. The amount of the loan outstanding at the close of 1916 was £357,000. The market price of these bonds as of January, 1918, was 91½ per cent, as compared with the high price since 1911 of 103.

Another issue to the amount of £350,000 was made in 1888 for the purpose of acquiring and extending a system of waterworks. The original issue was for £350,000 and has been nearly extinguished. The original offering price was 90. Interest is payable April and October.

In 1904 there were issued £1,000,000 5 per cent bonds, these being floated in London. A cumulative sinking fund of 1½ per cent per annum will retire the issue by 1934. The bonds are secured on the general revenues and assets of the State. The price, January, 1918, was 91.

In 1905 an issue of £3,800,000 5 per cent bonds was floated, largely in France, Germany, and elsewhere on the Continent of Europe, the proceeds to be used to purchase, extend, and develop the Sorocabana Railway. Approximately £3,500,000 bonds remain outstanding.

In 1913 an issue of £7,500,000 5 per cent Treasury bonds was authorized. Of these £4,000,000 were publicly offered at 97 per cent in London, Amsterdam, and Switzerland. The rest were subscribed—£2,500,000 by French bankers and £1,000,000 in Berlin, Germany. The loan is secured by a tax on coffee grown or exported and on coffee owned by the State. The entire issue is to be redeemed by 1923 by purchase in the market at or below par and by drawings at par. At the close of 1917 the issue had been reduced to £3,443,960 and at present the amount outstanding is smaller. The price, January, 1918, was 99.

In 1914 an issue of £4,200,000 two-year 5 per cent Treasury notes was sold, largely at 97 per cent. These were subscribed in London, Paris, Amsterdam, Hamburg, and elsewhere in Europe and were secured on the surtax on coffee. The notes matured January 1, 1916, and were largely extended. The notes were quoted in January, 1918, at 99¼ per cent.

The principal internal isues are as follows:

"Apolices."[1]	Interest rate.	Date of maturity.	Original issue.	Amount outstanding.[2]
	Per cent.		*Milreis.*	*Milreis.*
Third series	6	1952	5,000,000	4,792,500
Fourth series	6	1957	4,000,000	3,863,500
Fifth series	6	1953	4,000,000	3,863,500
Sixth series	6	1958	8,000,000	7,844,000
Seventh series	6	1960	10,000,000	10,000,000
Eighth series	6	1960	10,500,000	10,500,000
Ninth series	6	1960	25,000,000	25,000,000
Tenth series	6	1938	25,000,000	25,000,000

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[1] These issues are quoted on the Stock Exchange at São Paulo, and the May, 1917, quotation was 975 milreis per 1,000-milreis bond.

[2] Subject to slight variations.

STATE OF SERGIPE.

The State of Sergipe has an area of approximately 15,090 square miles and a population of probably more than 450,000. The State has no external debt, although it has two issues of internal bonds outstanding. These issues are as follows: Loan of 1907, 7 per cent, 1,500,000 milreis, par value 200 milreis; loan of 1915–16, 7 per cent. 2,500,000 milreis, par value 200 milreis. The loan of 1915–16 was admitted to quotation October, 1915. Its final amortization date is October, 1975. The issuance price was 90.

MUNICIPAL ISSUES.

Brazilian municipal external loans have found favor among European investors, and in the days before the war brought high prices. Rio de Janeiro, São Paulo, Para, Bahia, Bello Horizonte, Manaos, Pelotas, and Santos have been the principal borrowers, and their financial operations will be briefly reviewed here. São Paulo is the only municipality that has thus far contracted a loan in the United States, the 6 per cent bond issue floated in New York at the close of 1915 having been popularly received by investors.

CITY OF BAHIA.

The city of Bahia has two external loans outstanding, one of which was issued in Paris and the other in Paris and London. The French loan was originally for 25,000,000 francs and was declared redeemable by 1941. The loan was brought out in 1905 and was publicly offered at 82 per cent. The security assigned for its service was the revenue derived from water, drainage, and the local market.

The second loan was for £1,600,000 (40,000,000 francs), and was offered in 1912, mostly at 94½ per cent. The annuity required for the service of the loan was stated to be £87,398 and certain taxes. The security assigned for this loan consisted of the taxes on houses, industries, and professions. The interest rate on the loan is 5 per cent. The coupon due August 1, 1914, was not paid in cash, but was funded, together with later coupons, into 5 per cent funding bonds. The bonds of the issue of 1912 were quoted in January, 1918, at 61 per cent, as compared with the original offering price of 94½, as stated.

The internal debt of Bahia was stated in 1916 to amount to £733,315.

The population of the city is stated as nearly 300,000, and its revenue during a normal year (1912) totaled £368,500.

In addition to the external debt stated above, the municipality of Bahia, on March 19, 1914, issued a provisional bond for £1,521,000, bearing interest at 6 per cent per annum and redeemable by a sinking fund of ½ per cent per annum, in exchange for the undertakings of the Bahia Tramway, Light & Power Co. and the Compagnie d'Éclairage de Bahia, the loan being collaterally secured by a mortgage on the public-utility properties formerly operated by the two companies. Interest payments were delayed on these bonds, but were made March 29, 1915, £40,000 in cash and £42,000 in promissory notes due July, 1916. These notes were not met at maturity, and all other interest payments have been delayed.

BELLO HORIZONTE.

The municipality of Bello Horizonte issued during the year 1905 £225,000 6 per cent bonds, guaranteed as to principal and interest by the State of Minas Geraes. One-half of the issue was offered in London and one-half in Amsterdam, the offering price having been 97 and 98¼, respectively. Revenues to the estimated amount of £25,937 have been assigned to the issue, of which approximately £216,000 remains outstanding. The coupon due September 30, 1914, was paid in cash during January, 1915, and subsequent payments were, for a time, suspended. The bonds sold as high as 106 prior to the European war and were quoted at 75 in January, 1918.

The internal debt of the municipality consists of 2,500,000 milreis 6 per cent bonds, which have a par value of 200 milreis, and which sold during May, 1917, at 155 milreis (77½ per cent). The population of the city is probably not less than 35,000.

MANAOS.

The city of Manaos issued in London, during the year 1906, £350,000 5½ per cent bonds, with a sinking fund of 1½ per cent per annum, cumulative, commencing May, 1907. The issuance price of the bonds was 91 per cent, and they subsequently sold at least as high as 101 per cent. The coupons due November, 1914, and the 1915 coupons were delayed six months. In January, 1918, the quotation for the bonds was 82 per cent. The population of the city is estimated at 60,000. The bonds here described are secured on the revenues from the municipal market and slaughterhouse.

CITY OF PARA.

Para has outstanding three external loans, the bonds of which are mostly held in Great Britain, France, and Belgium. These issues were originally for £1,000,000, £600,000, and £600,000, respectively, all bearing interest at 5 per cent per annum. The loan of 1905 was for £1,000,000, of which £921,040 remained outstanding in 1917. Bonds to the amount of £252,580 were sold at 86 per cent and the rest used for the conversion of internal loans. The bonds were secured on all rent and license taxes, and provision was made, in case these taxes proved insufficient, whereby the general revenues of the city were to be drawn upon. The interest and principal of the loan are payable in London and Para. The sinking fund is ½ per cent cumulative. Since shortly after the outbreak of the European war, the interest has been payable in funding scrip at 110 per cent. At the closing of the London Stock Exchange July 27, 1914, the price of the bonds was 70 per cent; since that time, however, they have declined to below 50 (42@45 January, 1918).

The 5 per cent loan of 1906, of which £600,000 was issued and approximately £565,000 remains outstanding, is secured on the remainder of the revenues of the municipality after provision is made for the loan of 1905. The sinking fund of ½ per cent per annum was to have retired the loan by 1958. The interest was declared payable in London, Brussels, and Para, and the bonds are not regularly quoted in London. Interest during 1915 and subsequently has been funded. Most of the bonds are in 500 and 2,500 franc denominations.

The 5 per cent loan of 1912, of which £600,000 bonds were issued and £590,000 remain outstanding, is secured by the municipal revenue remaining after provision is made for the loans of 1905 and 1906. The bonds are not regularly quoted in London, but are mostly held in Brussels and elsewhere in Belgium. The sinking fund on this issue is ½ per cent per annum, cumulative, but has been suspended owing to the effect of the European war on the finances of Para. The interest on the loan has been funded.

The funding bonds issued in lieu of cash coupons were quoted in January, 1918, on the London Stock Exchange at 63–66.

The city of Para (Belem do Para) is the capital and chief city of the State of Para and the principal port of the Amazon River district. Its population probably exceeds 250,000.

PELOTAS.

The municipality of Pelotas, State of Rio Grande do Sul, has a population of approximately 65,000 and is one of the most important cities in that State. Under authority of the municipal council, dated September 24, 1910, the city sought a loan abroad, the principal of which amounted to £600,000. The loan was placed in Great Britain and in Switzerland, the original offering price being 95½ per cent. Interest is payable at the rate of 5 per cent per annum, semiannually (June 30 and December 31), and there is a sinking fund that will retire the issue by 1962. The security consists of the general revenues of the city and the house tax. Approximately £580,000 bonds remain outstanding. The high price on the London Stock Exchange for bonds of this issue has been 97, the low price 70, and the price in January, 1918, 73. The bonds bear the guaranty as to principal and interest of the State of Rio Grande do Sul.

The revenue from the house tax averages between £20,000 and £25,000 per annum, and the average prewar revenue of the city was approximately £110,000 per annum.

CITY OF PERNAMBUCO (RECIFE).

Pernambuco (Recife) has a population in excess of 200,000 and is one of the most important ports of the Republic. Its external debt consists of an original issue of £400,000 5 per cent bonds unconditionally guaranteed as to principal and interest by the State of Pernambuco. Approximately £393,000 of the bonds remain outstanding. The security assigned to the issue consists of a first charge on the revenues of the markets of Boa Vista and São Jose. The sinking fund of ½ per cent per annum commenced operations in 1911. Part of the proceeds of this loan were used to retire the then outstanding £172,000 internal debt. The revenues of the Boa Vista and São Jose markets during the five years prior to the European war were between £26,705 and £35,389. The bonds were publicly offered in May, 1910, in London at 93¼ per cent. The high price of the bonds since 1911 has been 99 and the low price about 64½. During January, 1918, they were quoted (in London) at 71.

PORTO ALEGRE.

Porte Alegre is the capital of the State of Rio Grande do Sul and has a population of 125,000. Its external loan, which was for

£600,000, was originally offered in June, 1909, in London and Amsterdam, at 93½ per cent. The interest dates are June and December 20, and the bonds are redeemable within 35 years (June 20, 1914). The entire house tax of the city has been assigned for the service of the loan, as well as the general revenues. In the normal year 1912 the house tax amounted to £75,507 and the general revenues of the city to £179,629. The highest price of the bonds on the London Stock Exchange since 1911 was 99¾, the low price 77¾, and the price in January, 1918, 81. The bonds are guaranteed as to principal and interest by the State of Rio Grande do Sul. All the proceeds of the loan were used to retire maturing funded debt.

CITY OF RIO DE JANEIRO.

Rio de Janeiro, the magnificent capital of Brazil, has a population of more than 1,000,000. On several occasions during recent years the city has sought loans abroad. There follows a list of outstanding external loans of the city and data concerning them:

Loans.	Original issue.	Approximate amount outstanding.	Original price.	High price since 1911.	Price, January, 1918.
4 per cent loan of 1889	£562,500	£300,000	87½	99	77
5 per cent loan of 1904	4,000,000	3,700,000	[a] 85	103	79
5 per cent loan of 1909	2,000,000	1,700,000	92.	104	83
4½ per cent loan of 1912	2,500,000	2,300,000	92½	94	72

[a] Issued in Rio de Janeiro at 85 and in London at 87½.

The 4 per cent loan of 1889 is repayable by an annual cumulative sinking fund of 1 per cent per annum, which will completely retire the issue by 1930. Interest on the issue is payable February and August, and the loan is secured by the revenue derived from the public market, the slaughterhouse, and the Maua Warehouses. The par value of the bonds is £100.

The 5 per cent loan of 1904 is redeemable within 50 years from date of issue by a sinking fund, and interest is payable April and October 1. The revenue from the property tax is assigned to the service of this issue. The proceeds of the issue were used for the improvement and sanitation of the city, and also for the paying off of internal "apolices" or consols.

The 5 per cent issue of 1909, interest on which is payable June and December 1, is guaranteed principal and interest by the Republic of Brazil. The loan was issued in Great Britain, the Netherlands, and Germany, while a few of the bonds are held in France. Interest is payable in pounds sterling, francs, marks, and guilders. The sinking fund is 2 per cent per annum, cumulative, the issue to be redeemed by 1935. The revenues of the trades-and-professions tax is assigned to the issue, this tax during the last year before the European war (1913) amounting to £269,963.

The 4½ per cent loan of 1912 was disposed of in Great Britain and the Netherlands. Interest is payable April and October 1, and there is a sinking fund of 1 per cent per annum, cumulative, redeeming the issue within 39 years of issue. A portion of the proceeds of the house-property tax has been assigned for the service of the issue.

The proceeds of this issue were to be used for the redemption of the 1896–1900 6 per cent loans to the amount of £869,000, for the repayment of £536,000 floating debt, and for municipal improvements. The authorized total of this issue is £10,000,000.

In addition to a large part of the £4,000,000 5 per cent external loan of 1904, the following internal loans are mostly held locally:

Loans.	Original issue.	Approximate amount outstanding.	Par value.	Market price.[a]
	Milreis.	*Milreis.*	*Milreis.*	*Milreis.*
6 per cent loan of 1906	30,000,000	29,691,000	200	194 (97 per cent).
5 per cent loan of 1909	4,000,000	3,610,000	200	167 (84 per cent).
6 per cent loan of 1914	20,000,000	20,000,000	200	184 (92 per cent).

[a] May, 1917, Rio de Janeiro.

The interest on the 6 per cent loan of 1906 is payable April and October, on the 5 per cent loan of 1909 January and July, and on the 6 per cent loan of 1914 March and September. The issues are listed on the Stock Exchange at Rio de Janeiro and enjoy a good local market.

A loan that is not directly an obligation of the municipality, known as the Rio de Janeiro 5 per cent Benedictine Order Gold Loan of 1909, for £300,000, has been marketed abroad. The loan was authorized by the Government of Brazil and by the General Chapter of the Benedictine Order in Brazil, was issued for free educational purposes, and is secured on lands and buildings with a stated valuation of £650,000. The sinking fund, which commenced operations in 1915, will retire the issue by July, 1959. Interest is payable January and July, and the bonds may be retired as a whole at 103 on three months' notice. They are free from all Brazilian taxes.

SANTOS.

Santos, the principal coffee port of the world, has a population of probably 75,000. Its external and internal debt consists of the following loans:

Loans.	Original issue.	Approximate amount outstanding.	Original price.	High price since 1911.	Price January, 1918.
6 per cent loan of 1888	£100,000	£28,200	(?)	105	93
6 per cent loan of 1910	1,000,000	980,000	97	105	80
7 per cent funding loan of 1915	(a)	(a)	(a)	(a)	93

[a] See second paragraph following.

The interest on the 6 per cent loan of 1888 is payable February and August, and the bonds are secured on alcoholic-liquor and license taxes.

The 6 per cent loan-of-1910 bonds have their value expressed both in British and Portuguese currency. April 30 and October 31 were the coupon dates assigned, and the sinking fund was fixed at 9.3444 per cent, cumulative, per annum. The coupon on this issue due October 31, 1914, was not met until January 31, 1915, when it was paid with interest added for three months at 6 per cent. Subsequent coupons during 1915 and 1916 and until October 31, 1917, were funded into 7 per cent bonds, repayable by April 30, 1933. Certain taxes have been assigned for the service of the issue of 1910 and of the 7 per cent funding bonds. The sinking fund on the latter issue commences operation January, 1919, and interest is payable April 30 and October 31.

The exports through Santos in 1916 totaled $117,511,778 and the imports $51,737,284.

CITY OF SÃO PAULO.

The city of São Paulo has an area of 14 square miles and a population of nearly 500,000, representing an eight-fold increase during the past 33 years. More than one-third of the people are of foreign birth and fully an additional third are direct descendants of Europeans. The factories of the city represent an investment of $12,000,000 and produce annually about $20,000,000 worth of goods. About 40,000 workmen are employed in these factories. The revenues of the city for 1915 were $2,162,900 and the expenses $2,030,500.

In 1908 São Paulo contracted a loan in London amounting to £750,000, bearing interest at the rate of 6 per cent per annum (payable January and July 1) and redeemable by January, 1944, through the operations of a 1 per cent sinking fund, cumulative. The loan is secured by the general revenue of the city and by the hypothecation of the revenue derived from the tax on trades and professions. It was estimated at the time of the bond issue that this tax would amount to £125,000 per annum. Approximately £650,000 of the bonds remain outstanding. The bonds were quoted at 95½ in January, 1918.

Late in 1916 the city arranged a loan for $5,500,000 with the New York banking firm of Wm. Morris Imbrie & Co., and the Equitable Trust Co., of New York. The loan bears interest at 6 per cent per annum and matures serially January 1, 1919 to 1928. The prices at which the loan was publicly offered in the United States were 96.09 to 100, the prices depending on the maturity dates. The yield basis was 6 to 6½ per cent.

The internal loans of the city outstanding in 1916 bore interest at 7 per cent and 6 per cent per annum. These loans were in six series hereinafter enumerated. The bonds mostly enjoy a good local market, being listed on the stock exchange at São Paulo (one of the issues is also listed at Rio de Janeiro). The list of issues, amount outstanding, maturity date, and other data will be found in the following table:

Issues.	Interest rate.	Date of maturity.	Original issue.	Amount outstanding.[a]	Quotation May, 1917.
	Per cent.		*Milreis.*	*Milreis.*	
First issue	7	1970	600,000	525,000	84
Second issue	7	1951	1,000,000	742,900	82
Viaduct loan	6	1990	700,000	622,500	74
Issue of 1913[b]	7	1962	14,868,600	14,868,600	84
Issue of 1914[b]	7	1919	10,000,000	7,169,500	92½
Italian Bank Loan	7	....	11,791,000	11,791,000	....

[a] Year 1916.

[b] The loans of 1913 and 1914 were each offered at 90 per cent of par (100 milreis).

INTERNAL AND SEMIEXTERNAL OBLIGATIONS OF BRAZILIAN MUNICIPALITIES.

A large number of Brazilian cities and towns have contracted internal loans. These enjoy favor among Brazilian investors, and in many instances sell to yield very satisfactory returns. The following partial lists of bonds of this character listed in Rio de Janeiro and São Paulo will indicate the prices, yields, etc.:

RIO DE JANEIRO STOCK EXCHANGE.

Municipalities.	Interest rate.	Original issue.	Amount outstanding.	Par value.	Price, August, 1917.
	Per cent.	*Milreis.*	*Milreis.*		
São Jose de Alem Parahyba	7	400,000	(?)	200	198
Petropolis	7	520,000	126,800	200	....
Alfenas (State of Minas Geraes)	9	100,000	80,000	100	105
Bage (Rio Grande do Sul)	7	1,000,000	1,000,000	1,000	1,030
Bello Horizonte	6	2,500,000	2,500,000	200	155
Nictheroy	6	4,500,000	4,500,000	100	79

NOTE.—In addition to the above, there remains outstanding the balance of two 7 per cent issues, 5,000,000 milreis and 1,000,000 milreis, of the municipality of Nictheroy. The issues are dated 1908 and 1910, respectively.

SÃO PAULO STOCK EXCHANGE.

Municipalities.	Interest rate.	Date of maturity.	Original issue.	Amount outstanding.	Original price.	Price, May, 1917,
	Per cent.		*Milreis.*	*Milreis.*	*Per cent.*	*Per cent.*
Campinas	6	1961	5,500,000	5,458,600	90	76
Capivary	7	1961	1,000,000	985,200	90	40
Jahu	7	1943	1,800,000	1,758,900	92½	75
Itu	7	1953	1,285,000	1,281,900	(?)	50–65
Amparo	8	1950	1,300,000	1,192,100	94	90
Araraquara	8	1960	1,000,000	978,940	93	80
Barretos	8	1941	800,000	800,000	90	70
Bauru	8	1961	500,000	500,000	100	32
Itapetininga	8	1951	800,000	860,000	85	34
Mococo	8	1961	750,000	732,900	92	78
Ribeirão Preto	8	1956	2,000,000	1,989,300	85	90
S. João da Boa Vista	8	1951	1,000,000	992,200	95	70
São Carlos	8	1971	1,250,000	1,250,000	92	72
Santa Cruz de Rio Pardo	8	1941	1,000,000	667,700	95	26–35
Botucatu	10	1936	471,000	440,600	85	95
Jacarehy	10	1932	806,000	306,000	85	15
S. João de Bocaina	10	1934	250,000	226,100	85	80
Taquaradinga	10	1935	500,000	492,300	85	60
São Simão	12	1926	233,000	203,400	....	102
Uberaba	8	1931	350,000	343,500	90	90

NOTE.—Par value of above issues usually 1,000 milreis.

With about four exceptions, which are indicated by prevailing prices, all of the above issues, together with a large number of other municipal bonds not mentioned above, pay their interest regularly. As may readily be seen, the income yields on these securities are very large in every instance, averaging between 9 and 12 per cent; the yields to maturity, with the single exception of the São Simão 12 per cent bonds, being still larger—in some instances exceeding 15 per cent per annum.

In addition to the bonds mentioned in the preceding table there are listed in São Paulo several municipal obligations of a semi-external character, these bonds being held partly in France and partly locally. These issues include the following:

Municipalities.	Interest rate.	Date of maturity.	Original issue.	Amount outstanding.	Original price.
	Per cent.		*Francs.*	*Francs.*	*Per cent.*
Jundiahy	7	1920	2,185,000	2,185,000	87
São Bernardo	7	1941	700,000	677,500	87
Piraju	7	1945	1,857,500	1,857,500	90
Bebedouro	8	1943	1,015,500	1,015,500	85
Itatiba	7	1941	650,000	650,000	85
Casa Branca	8	1950	685,000	685,000	83

None of these issues is actively quoted. Interest on the Jundiahy issue is payable January and July, on the São Bernardo issue May and November, and on the other issues March and September. The bonds are in 500-franc denominations.

BANKS.

The great banking centers of Brazil are naturally Rio de Janeiro and São Paulo. Santos ranks third in importance, with Bahia, Para, Pernambuco, Rio Grande do Sul, and Porto Alegre holding a very large percentage of the remaining deposits.

There are a considerable number of foreign or semiforeign banks in the Republic. The National City Bank of New York has been the pioneer American institution in the field, having established successful branches at Rio de Janeiro, São Paulo, Bahia, and Santos. These branches are well patronized and give evidences of continued growth and prosperity. The British banks in the field are the London and Brazilian, the London and River Plate, and the British Bank of South America. The London and Brazilian Bank has an authorized capitalization of £2,500,000 (of which £1,250,000 has been issued) and a reserve fund of £1,400,000. Branches and agencies are maintained in Brazil at Rio de Janeiro, São Paulo, Manaos, Para, Ceara, Pernambuco, Bahia, Santos, Curitiba, Rio Grande do Sul, and Porto Alegre, as well as in Great Britain, the United States, Portugal, Argentina, and Uruguay. The London and River Plate Bank has branches at Rio de Janeiro, São Paulo, Santos, Para, Pernambuco, Bahia, Victoria, Curitiba, and Manaos. The British Bank of South America is established at Rio de Janeiro and in several other cities in the Republic.

Germany, prior to the war, in carrying out its policy of trade expansion in South America, had established banks in most of the important trade centers of Brazil. The Banco Alemán Transatlántico maintained five branches in the Republic, while the Brasilianische Bank für Deutschland had five branches and by far the largest deposits of any of the German institutions. The Deutsch-Südamerikanische Bank also maintained a branch. The first named of these banks, established primarily for the Brazilian trade, paid, during the 27 years prior to the outbreak of the European war, 270½ per cent in dividends, an average of 10 per cent per annum. The more recent returns of this bank and other German institutions in Brazil have not warranted expectations of increased dividends. The Brasilianische Bank für Deutschland is controlled in the interest of the Diskontogesellschaft and the Norddeutsche Bank, both of Germany. It was founded in 1887 with a capitalization of $2,500,000, of which 25 per cent was paid in. Its present capitalization is $3,750,000. Its principal branches are located in Rio de Janeiro, São Paulo, Santos, Bahia, and Porto Alegre. The Banco Alemán Transatlántico maintains 4 of its 26 South American branches in Brazil, these being located in Rio de Janeiro, São Paulo, Santos, and Petropolis. This institution is controlled by the Deutsche Bank, of Germany, and is capitalized at $7,500,000. It has been one of the pillars of German power in South America, and previous to the breaking of diplomatic relations by several of the Latin Republics wielded great influence in international affairs. The Deutsch-Südamerikanische Bank has established a branch in Rio de Janeiro, which, among its South American agencies, is second in importance only to its branch in Buenos Aires. It is controlled by several important German banks, was established in 1906, and is capitalized at $5,000,000.

There are a number of other important foreign banking institutions in Brazil. The Banco Hollandez da America do Sul (Dutch Bank of South America) has a branch in Rio de Janeiro. The authorized capital of this bank is 25,000,000 florins, of which 14,000,000 florins shares have been issued and are outstanding. The Banco Nacional Ultramarino, which has its head office at Lisbon, Portugal, and branches throughout Portuguese Africa, has also entered the field. The capitalization of the bank is 7,200,000 Portuguese milreis shares of a par value of 90 milreis. A portion of the capitalization is held in Brazil. The bank was founded in 1864 and has steadily increased in commercial importance.

The French and Italian Bank for South America, founded in 1900 with head office in Paris, has a capital of 25,000,000 francs and a reserve of 11,150,000 francs. The shares of this bank have a par value of 500 francs and are partly held in Brazil, being listed on the stock exchanges of Rio de Janeiro and São Paulo. A dividend of 8 per cent was paid in 1916. The head office of this bank is at Paris. The Banque Brésilienne Italo-Belge has a capitalization similar to that of the French and Italian Bank, 25,000,000 francs, and is an important institution in São Paulo. The French Bank for Brazil is a more recent institution, having been founded in 1912. It is largely controlled in Antwerp and its capitalization is 15,000,000 francs. These two last-mentioned banks are in liquidation.

There follows a list of important national and foreign banks operating in Brazil, with the capitalization, reserves, last dividend payments, etc. The figures are those of the Rio de Janeiro Stock Exchange, as of March 31, 1917:

National and foreign banks.	Capital.	Par value.	Paid in.	Reserves.	Last dividend.	Last sale.
						Milreis.
Brasil..................milreis..	70,000,000	200	200	8,987,551	8 milreis......	210
Brasilianische Bank für Deutschland..........marks..	15,000,000	1,000	1,000	8,100,000	8 per cent.....	....
Brésilienne Italo-Belge.francs..	20,000,000	500	200	....	....	....
British Bank of South America, pounds sterling.............	2,000,000	20	10	1,091,826	10 shillings....	....
Commercial do Rio de Janeiro, milreis.........................	10,000,000	200	200	3,405,822	7 milreis......	155
Commercio.............milreis..	7,000,000	200	200	4,465,931	7 milreis......	158
Commercio e Industria de São Paulo...............milreis..	10,000,000	200	200	20,705,584	18 milreis.....	....
Commercial do Estado de Spo Paulo...............milreis..	12,000,000	200	120	853,552	4.2 milreis.....	....
Constructor do Brasil.....do....	1,312,000	100	100	838,981	3 milreis......	....
Credito Hypothecario e Agricola do Estado da Bahia...francs..	10,000,000	500	50	....	....	....
Credito Rural de Minas Geraes, milreis.........................	7,000,000	200	145	1,260,933	6 per cent.....	180
Credito Rural e Internacional milreis.........................	1,400,000	200	200	232,966	3 milreis......	129
Credito Hypothecario e Agricola de São Paulo..........francs..	10,000,000	500	250	[a]2,135,260	....	....
Credit Foncier du Brésil.do....	50,000,000	500	250	3,371,299	....	....
Español del Rio de la Plata, Argentine gold pesos..........	100,000,000	100	....	48,501,647	12 per cent....	....
Estado do Rio de Janeiro, milreis.........................	2,000,000	10	20	7,159	....	....
Francese Italiano per l'America do Sul................francs..	25,000,000	500	500	12,225,344	8 per cent.....	....
Funccionarios Publicos.milreis..	1,497,500	50	50	561,728	3 milreis......	60.5
Hypothecario do Brasil...do....	16,000,000	200	....	2,951,575	1 milreis......	41
London & Brazilian Bank (Ltd.).......pounds sterling..	2,500,000	20	10	1,250,000	17 per cent....	....
London & River Plate Bank (Ltd.).......pounds sterling..	4,000,000	25	15	2,000,000	15 per cent....	....
Lavoura e Commercio do Brasil...................milreis..	5,530,000	200	200	417,520	7 milreis......	150
Mercantil do Rio de Janeiro, milreis.........................	5,000,000	200	200	460,427	8 milreis......	205
Nacional Brasileiro.......do....	2,000,000	200	200	785,793	7.5 milreis.....	175
Nacional Ultramarino .escudos..	7,200,000	90	90	2,860	6 per cent.....	300
Provincia do Rio Grande do Sul..................milreis..	10,000,000	200	100	9,463,797	6 milreis......	245
União de São Paulo.....do....	10,000,000	200	200	....	....	....

[a] Milreis.

The Banco do Brasil, which is a semigovernmental institution, is capitalized, as stated, at 70,000,000 milreis. Its annual dividend rate is 16 milreis payable January and July, equal to 8 per cent per annum on the 200-milreis stock. The regular deposits as of April 30, 1917, amounted to 193,469,924 milreis. The original Banco do Brasil was founded in 1809 with a capitalization of $2,000,000. This bank failed in 1828 and was liquidated in 1829. In 1852 a new Banco do Brasil was founded. In the early stages of the Paraguayan war it experienced difficulties, from which, however, it recovered with some degree of success. In 1893 the bank was amalgamated into the Banco da Republica, assuming the latter title, which was held until 1905, when it again became the Banco do Brasil. Its present dividend of 8 per cent compares with the 1912 and 1913, pre-war, rate of 10 per cent per annum.

The Banco do Commercio e Industria de São Paulo is a very important institution. Its head office is at São Paulo, and agencies are maintained at Santos and Ribeirão Preto. This is primarily a bank for the financing of coffee crops and enjoys considerable prosperity, its 200-milreis shares being quoted at about 500 milreis. The bank was founded in 1889 and its shares are widely held in São Paulo.

INSURANCE COMPANIES.

There follows a list of important insurance companies, mostly local, doing business in the Republic of Brazil. The table shows capitalization, value of shares, etc.:

Companies.	Capitalization.	Par value.	Paid in.	Reserves.	Last sale.
	Milreis.	*Milreis.*	*Milreis.*	*Milreis.*	*Milreis.*
Anglo Sul-Americano	2,000,000	200	80	314,134	100
Aliança da Bahia	3,000,000	1,000	1,000	3,007,836	....
A Mundial	500,000	100 100	100 20	139,798	....
Argos Fluminense	2,100,000	700	700	1,280,083	1,020
Brasileira de Seguros	2,000,000	200	80	165,556	....
Brasil	1,000,000	100	40	61,943	38
Caixa Geral das Familias	1,600,000	200	100	959,636	....
Confiança	2,000,000	200	70	508,802	100
Cruzeiro do Sul (life insurance)	800,000	200	200	1,174,345	95
Garantia	2,500,000	1,000	300	358,607	325
Indemnizadora	1,000,000	1,100	40	....	20
Integridade	2,000,000	200	70	137,790	60
Minerva	1,000,000	100	40	2,353	24
Paulista	2,000,000	200	100	1,450,103	....
Pelotense	2,000,000	200	35	358,100	140
Previdente	2,000,000	400	400	1,096,048	510
Sul America (life insurance)	500,000	200	100	35,870,945	250
Taregistas	1,000,000	200	150	447,943	230
União dos Proprietarios	500,000	100	50	670,050	106

RAILWAY DEVELOPMENT.

Brazil stands second in railway mileage operated among the various South American countries. There are more railways in Brazil than in any other South American Republic, but many of these lines are short and unimportant. The total railway mileage to-day exceeds 16,540 miles, comparing with 9½ miles in 1854, 265 miles in 1863, 578 miles in 1872, 2,768 miles in 1882, 7,027 miles in 1892, 9,725 miles in 1902, 10,938 miles in 1907, and 14,213 miles in 1912. That there is room for railway development on a much larger scale than heretofore is an unquestionable fact. Brazil's amazing potential wealth, once more population is secured, is certain to be developed on an ever-increasing scale and will create a far greater volume of railway traffic than is being handled at the present time. The economic unity of the Republic is largely dependent on systems of railways that will link the great centers of wealth and population one with another. Although the Brazilian States are harmonious and loyal to the nation, commercially and industrially they are independent to a very marked extent.

Although Brazil borders on all of the South American countries with the exception of Chile, it is in direct rail communication only with Uruguay, and in making connections with the Uruguayan railways a break in gauge is necessary. Interchange of traffic between Uruguay and Brazil has been recently much improved through the establishment of an international passenger-train service, with weekly trips between São Paulo and Montevideo. Sleeping and dining cars are carried, and only two changes of cars are necessary, neither of these occasioning a wait of more than a few minutes. The running time of trains between the two cities is 108 hours and 30 minutes, and the service is generally very good.

The uneven topography of Brazil has had much to do with retarding railway development. Rio de Janeiro, unlike Buenos Aires and Montevideo, is surrounded by a veritable wall of abrupt mountains, which has rendered construction costly in the extreme. Important railways such as the Leopoldina, the Central of Brazil, the São Paulo, and the Parana have had to contend with considerable engineering difficulties because of the rough, uneven territories traversed.

Railroads were first talked of in Brazil at as early a date as 1835. In that year a bill was introduced in Congress and duly passed, authorizing the granting of concessions to build railways from Rio de Janeiro into the Provinces of Minas Geraes, Bahia, and Rio Grande do Sul, a program that has not yet been fully carried out. A concession to build a line from Rio to Campanhia was granted in 1838, but no effort was made to construct the line. In 1840 Dr. Thomas Cochrane secured an exclusive privilege for 80 years to build "an iron road to extend from near Rio de Janeiro to São Paulo, by means of a company of Brazilians or foreigners to be organized by him." In the concession it was stated that "in the railway of the company shall be employed cars moved by animals or by steam or by any other subsequently discovered agent that may best accomplish the desired end of carrying persons or articles of labor and industry of whatever nature, with security, economy, and rapidity." The capitalization of the company was fixed at 8,000,000 milreis. The concession lapsed in 1845 and, by payment of a fine, was extended. Cochrane was never able to carry out his scheme and his concession simply acted as an obstacle in the way of others financially able.

It was not until 1854 that the first railway mileage in Brazil was placed in operation. The first railway was 5 miles in length and extended from Maua on the north shore of Rio de Janeiro harbor to Fragosa. This line was carried up the Petropolis Mountain a short time afterwards and to-day forms a part of the Leopoldina Railway system. Among South American railways this line is outdated only by the Demerara Railway, in British Guiana, and by the Caldera to Copiapo Railway, built by Wheelwright in Chile.

CENTRAL OF BRAZIL RAILWAY.

The existing Central of Brazil Railway came into being in 1852 under the tile of the "Estrado de Ferro Dom Pedro I." It was not until 1855, however, that Cochrane, who held a concession covering a route similar to the one projected by the Dom Pedro I line, was prevailed upon (by means of a monetary consideration) to withdraw from the field. On March 29, 1858, the first section, 32 miles in length, was opened for traffic, the company at that time having 10 locomotives, 40 passenger cars, and 100 freight cars. Gross receipts for the first year totaled 302,279 milreis and operating expenses 205,590 milreis. Although there was an increase in gross earnings to 729,197 milreis the year following, net earnings increased only about 14,000 milreis and the company was compelled to contract through the firm of N. M. Rothschild & Sons a loan for £1,425,000 to meet current expenses and to continue the line for an additional 28½ miles. This section of the line presented immense engineering difficulties. There is on this section the Tunnel Grande, 7,336 feet in length, the completion of which took seven years and virtually bankrupted the company. In 1866 the then hopelessly insolvent company was taken over by the Government and the line has since been operated as a Federal railway. Under Government ownership the line was steadily extended, despite the fact that construction was costly because of the number of tunnels, bridges, retaining walls, cuts, and fills. The railway system as it now exists forms a network of lines extending from Rio de Janeiro to São Paulo, Bello Horizonte, and a number of other points. Excellent passenger service is maintained between various through points and there is a very heavy suburban traffic. The equipment is generally good, and fast time is made on through express trains.

The expansion of the Central Railway is shown in the following table:

Years.	Receipts.	Expenses.	Net profit or loss.	Length of lines operated.	
	Milreis.	*Milreis.*	*Milreis.*	*Kilometers.*	*Miles.*
1858	302,279	205,590	+ 96,690	51	32
1868	2,819,831	1,255,514	+1,564,317	203	126
1878	10,022,525	5,560,205	+4,462,319	583	362
1888	12,593,377	6,880,810	+5,712,567	807	501
1898	34,106,659	31,043,580	+3,063,078	1,222	759
1908	29,720,625	32,182,377	−2,461,752	1,764	1,096
1909	31,226,524	31,262,510	− 35,986	1,769	1,099
1910	29,448,566	36,707,940	−7,259,374	1,789	1,112

The cost of the railway to December 31, 1910, was approximately $80,136,700, which figure, owing to deficits on several occasions and to various improvements and minor extensions, had probably increased to $95,000,000 in 1917. Plans were under way in 1916 to form the Central Railway of Brazil into a corporation with an approximate capitalization of $97,000,000, to be divided into about $58,000,000 stock and about $39,000,000 debentures. It was stated that one-half of the shares would probably be offered for sale in the large financial centers of the United States and Europe. The Government will hold all of the debentures, but will receive no interest thereon. The following estimate is given of the finances of the railway provided it be operated on a thoroughly commercial basis (figures are in United States currency): Gross revenue (estimated), $16,222,000; operating cost at 70 per cent, $11,355,400; net receipts, $4,866,600. One-half of this profit would go to the Government and one-half to the shareholders, this sum being equal to about 8 per cent on their investment for the first year of operation under this scheme.

It is planned to carry the Central Railway system northward across the Republic to Para and to build various sections in new territory.

During recent years the Central of Brazil Railway has handled annually upward of 25,000,000 passengers and a large freight tonnage consisting of coffee, lumber, sugar, iron, manganese, etc.

SÃO PAULO RAILWAY.

Probably the most successful among the railways of the Republic is the São Paulo Railway, operating a system of 5-foot 6-inch gauge extending from Santos to Jundiahy, 139 kilometers (86 miles), and a meter-gauge line known as the Bragantina section, 108 kilometers (67 miles). The railway forms the natural means of transport to and from the sea of most of the exports and imports of the State of São Paulo, the most important in the entire Republic. The extent of the traffic during recent years is illustrated by the table that follows:

Years.	Passengers carried.	Coffee.	Other freight.
		Sacks of 60 lbs.	*Tons.*
1911	2,438,664	9,255,417	1,809,038
1912	3,096,493	9,501,417	2,270,217
1913	3,511,016	11,158,083	2,570,484
1914	3,253,618	9,507,350	1,844,095
1915	2,945,015	13,444,766	1,720,070

The São Paulo Railway's main line normally produces more revenue per mile than any railroad in the Western Hemisphere and earns annually very substantial profits. (See Appendix, p. 512.) It annually carries two-thirds of the world's coffee supply. The line was first constructed in the year 1867 and presented numerous engineering problems. There were on the original line (which still exists, though it is not very regularly used) four different stretches of track that had to be laid on a 10 per cent grade. Trains are operated up and down these grades by means of heavy wire ropes. In the year 1901 a duplication of the entire Serra or mountain section of the line was completed. This new line followed an entirely different route from the original line, its maximum grade being 8 per cent. Wherever these heavy gradients are encountered the endless-rope system is used. These rope cables will support loads of 145 tons per train, and the trains are otherwise protected against accidents by brake locomotives and other of the latest safety appliances. The railway is constructed in an admirable manner, as those who have used it will testify, and the scenery along the route is most beautiful. The passenger station and terminals at São Paulo are very substantial, and the equipment in service is of the very finest.

The outstanding securities of the São Paulo Railway and the range of quotations thereon are shown in the following table:

Securities.	Amount outstanding.	Par value.	High price since 1911.	Price January, 1918.
Ordinary stock	£3,000,000	£100	270	183
5 per cent non-cumulative preference stock	1,000,000	100	116¼	83
5 per cent permanent debenture stock	250,000	100	118	86
5½ per cent permanent debenture stock	750,000	100	128	97
4 per cent permanent debenture stock	1,000,000	100	105	71

LEOPOLDINA RAILWAY.

This important British-controlled line, or combination of lines, totals 1,831 miles in length, and extends from Nictheroy, opposite Rio de Janeiro, northward to Friburgo, Campos, Victoria, Leopoldina, and other points in the States of Minas Geraes, Rio de

Janeiro, and Espirito Santo. Lines also run from the city of Rio de Janeiro and Maua up the mountain to Petropolis, continuing until connections are made with the main system. The line follows the winding valley of the Paranhyba River for a distance and then strikes across a series of abrupt mountain ranges. There are four of these mountain ranges, and in order to surmount them many spectacular engineering feats had to be performed. The maximum grade on the main system is 8 per cent and on the Petropolis section 15 per cent.

There follows a statement of the earnings and profits of the Leopoldina Railway, covering a period of three years, 1914 to 1916:

Items.	1914	1915	1916	1917
Gross receipts	£1,549,866	£1,537,700	£1,319,657	£1,580,241
Working expenses	1,086,961	1,034,851	898,425	1,089,646
Net receipts	462,905	502,849	421,232	490,595
Brought forward	138,003	138,843	145,247	152,235
Total net income (including other income)	624,258	644,007	597,189	665,035
Debenture interest	229,996	230,155	230,155	234,154
Reserves	30,218	42,404	58,305	34,300
Preference dividends (5½ per cent)	156,494	156,494	156,494	156,494
Ordinary dividends	[a] 68,707	[a] 68,707	None.	103,060
Balance carried forward	138,843	146,247	152,235	137,027

[a] 1 per cent.

The dividend rate on the ordinary shares for the year 1917 was 1½ per cent.

Gross receipts for 1913 were £1,870,371; 1912, £1,688,926; 1911, £1,365,919; 1910, £1,318,116; 1909, £1,215,083; 1908, £106,617; and 1907, £1,254,557. Dividend payments on the ordinary shares during 1913 and 1912 were at the rate of 4 per cent per annum; 1911, 2 per cent; 1910, 3½ per cent; 1909, 3¼ per cent; 1908, 3½ per cent; 1907, 4½ per cent; 1905 and 1906, 4 per cent each. A portion of the system reverts to the Government in 1964 and 1999. The company receives small guaranties on sections of the lines, these guaranties expiring in 1918 and 1919.

The Companhia do Porto de Victoria is controlled by the Leopoldina Railway, which also owns a one-half interest in the shares of the Leopoldina Terminal Co. (see a later paragraph), guaranteeing that company's 5 per cent first debentures, to the amount of £1,250,000.

The capitalization and value of the securities of the Leopoldina Railway are as follows:

Securities.	Amount outstanding.	Par value.	High price since 1911.	Price January, 1918.
Ordinary shares	£6,870,690	£100	78¼	39
Preference shares, 5½ per cent	2,845,340	10	11¼	8
4 per cent debenture stock	4,495,300	100	97	66
5 per cent terminable debentures	1,000,000	100	103	92½
Total	15,211,330			

The present mileage, 1,831, compares with 1,651 miles operated in 1912, 1,542 miles in 1908, 1,423 miles in 1905, and 1,412 miles in 1903. Despite the necessarily heavy grades encountered, the territory traversed by the railway is highly productive, and revenues from traffic, once normal conditions are restored, seem destined to grow considerably.

LEOPOLDINA TERMINAL CO.

In the year 1911 the Leopoldina Terminal Co. was formed to acquire shares of the Companhia Cantareira e Viação Fluminense, owning and operating a fleet of ferryboats plying between Rio de Janeiro and Nictheroy (connecting with trains of the Leopoldina Railway), the entire electric tramway system of the city of Nictheroy, 73 kilometers (45 miles), and warehouses in Rio de Janeiro. The capitalization of the Leopoldina Terminal Co. is £1,250,000, of which £625,001 is held by the Leopoldina Railway; also £1,250,000 5 per cent debentures, guaranteed by the railway company. Before the outbreak of the war in Europe 1¼ per cent per annum was paid on the stock. At present no dividend is being paid. The stock was quoted in January, 1918, at 5s., as compared with approximately 10s. in 1914. The debentures were quoted at 82 in January, 1918, the high price since their issue having been 104½.

BRAZIL RAILWAY.

The Brazil Railway was incorporated in Maine, U. S. A., in 1906, for the purpose mainly of acquiring various railways and concessions for railways in southern Brazil, with the view of connecting them into one comprehensive system and joining them at the international borders with Uruguay, Argentina, and Paraguay. The plan was subsequently enlarged to cover the acquisition of certain ports connecting with the railway systems and of industries likely to be operated with profit and to give traffic to the railways.

The Brazil Railway first acquired control of the four railways which at present make up the system that it operates directly—the Sorocabana, São Paulo-Rio Grande, Parana, and Auxiliaire Railways. The company also acquired a half interest in the Madeira-Mamore Railway, the other half being taken by the Port of Para Co. (see p. 156); the Brazil Railway assumed the principal burden of financing the construction of this enterprise.

Through subsidiaries, the Southern Brazil Lumber & Colonization Co. and the Brazil Land, Cattle & Packing Co., large tracts of land were purchased, and at the same time control was acquired over the extensive land grants of the São Paulo-Rio Grande Railway. This latter company obtained, at the time of being taken over, the voting control of the Paraguay Central Railway.

The Brazil Railway, at about the same time, acquired large interests in two Brazilian railway companies, the Paulista and Mogyana companies, and then obtained control of the Port of Rio Grande do Sul and the Port of Rio de Janeiro, through the ownership of a large majority of the shares of the two French companies that had acquired the concessions for those ports. Sites for the construction of hotels in Rio de Janeiro and São Paulo were purchased, and the Guaruja Hotel near Santos was acquired and enlarged.

Lumber mills were erected by the lumber company, and the cattle company began breeding cattle on an extensive scale, importing thoroughbreds from America to improve the native cattle. The company then acquired large share interests in five different Uruguayan railway companies and in the Antofagasta (Chile) & Bolivia Railway.

The construction of a cold-storage plant at Rio de Janeiro was also begun, and the cattle company, through a subsidiary, the Continental Products Co., undertook the construction of a large packing plant at Osasco, near São Paulo. By the control of its various subsidiaries the Brazil Railway had committed itself to an expensive program of railway construction in Brazil, Uruguay, and Bolivia, and many of its industrial enterprises were in a formative period and required considerable sums of money to bring them to a point of production. This was the state of affairs at the time of the outbreak of the Balkan war in 1912, when money became difficult to obtain, and this rapidly growing concern was suddenly confronted with a shortage of funds.

At the same time the world's financial crisis made itself felt, particularly in Brazil, and the earnings of the producing companies were considerably curtailed. Much work had been done by the various subsidiaries for the account of the Brazilian Government, and large sums of money were unpaid. The financial difficulties of the Brazilian Government seemed about to be finally solved by means of an international loan, which would have enabled these debts to be paid and would have given the Brazil Railway some measure of relief, when the European war broke out and the company found itself unable to meet its obligations.

The principal source of revenue for the maintenance of the Government is its customs duties. As a result of the war, imports were more than cut in half and the Government found itself unable to meet its obligations in cash. The fall in exchange dealt the revenue of the company a severe blow, and it was decided that the best interests of security holders would be served by the appointment of a receiver.

The Brazil Railway owns about 40 per cent of the shares of the Paulista Co. and about 26 per cent of the shares of the Mogyana Co., valued in 1915 at £3,066,760 and £1,542,700. Both of these companies (which see) are under Brazilian control and management and are excellent, conservatively operated properties. The Paulista Railway's bond issue is said to amount to less than 20 per cent of the value of the property, while the Mogyana property is capitalized at a very reasonable figure.

The Sorocabana Railway has a total length of 1,360 kilometers (864 miles) and is spread over a greater area than either the Paulista or Mogyana railways. Practically its entire preferred and common stock is owned by the Brazil Railway. The Sorocabana Railway traverses a growing and extremely rich part of Brazil, making important traffic connections with other companies, and is opening up new, fertile territory. In spite of certain faults of location and the fact that light rail and ballast are used on sections of the line, the Sorocabana Railway is a good property with good earning power and great possibilities. Future construction will probably be limited to branches designed to reach important traffic-developing points and to develop the country within a reasonable distance of the main line.

The Sorocabana Railway holds a 60-year lease of the property, on a profit-sharing basis with its owner, the State of São Paulo. It has a fairly large bonded debt, partly represented by capital raised by the State for its construction and partly bonds, etc., issued by the railway company. The total stock issue of the company is only 40 per cent of that of the Paulista and Mogyana railways.

The railway holds investments in other companies, including important interests in the Paulista Railway, the Compagnie Auxiliaire, the Port of Rio de Janeiro, etc.

The São Paulo-Rio Grande Railway covers a total length of 1,372 kilometers (853 miles). It goes through a sparsely settled territory, the soil of which is not equal to some sections of southern Brazil. During the war period this line has had difficulty in meeting operating expenses, but it is expected that the Southern Brazil Lumber Co., which is located along the line, will in time develop sufficient traffic to place it on a profitable basis. The bonds of this railway company are guaranteed as to interest for 30 years by the Brazilian Government. Following the outbreak of the war certain of the payments of this guaranty were met by the payment of funding bonds instead of cash. It is generally expected that development will be slow throughout the thinly settled territory tributary to the railway, but it is anticipated that in time substantial progress will be made and settlers will be attracted by low land values and the opportunities offered.

The Parana Railway, operated by the Brazil Railway, has a total length of 416 kilometers (258 miles) and covers a somewhat more promising territory than the São Paulo-Rio Grande Railway. Overhead charges are high, and it has been found difficult to earn a profit. Large sums have been expended on improvements, considerable sections of the line having been almost entirely rebuilt. Negotiations were under way in 1916 leading to a reduction of the terms of the lease by the Government to the company.

The Brazil Railway owns the capital stock of the Norte do Parana Railway, operating a short line from Curitiba northward, which handles a light though growing traffic. This line formerly was the property of the Government.

The Thereza-Christina Railway, another line of no special importance, leased by the São Paulo-Rio Grande Railway, is operated without profit to the Brazil Railway. In the receiver's report concerning the condition of the various Brazil Railway enterprises, it was advocated that this concession be forfeited.

The Brazil Railway owns a majority of the common and preferred stock of the Compagnie Auxiliaire de Chemins de Fer au Brésil (incorporated in Belgium and constructed by Belgian interests), which has an exclusive Federal concession for operation in the State of Rio Grande do Sul. The line runs through a magnificent territory with great future prospects. Cattle, cereals, and various temperate-zone products may readily be raised, and the railway has for years shown a consistent, steady growth in earnings, this increase averaging 10 per cent per annum. The railway, however, is in need of additional capital, having been lightly built and only partially ballasted, the bridges being so lightly constructed that the economical operation of heavy trains is impossible. The European war checked the development of this railway to a considerable extent, but the opening in 1915 of the Port Works at Rio Grande do Sul is certain to give a stimulus to the earnings of the road in the future. The gross receipts per kilometer, although they have increased from year to year, as stated, are still far below those of most of the railways operating in such States as São Paulo and Rio de Janeiro. The finances of the company are somewhat pyramided, being mostly bonds and but little stock, but with a few years of increased earnings should realize substantial profits, despite this disadvantage.

The Madeira-Mamore Railway (see p. 155), which, as stated, is controlled jointly by the Brazil Railway and the Port of Para Co., is 226 miles in length. The property is in receivers' hands.

The Uruguay railway companies in which the Brazil Railway has acquired an interest are discussed in the chapter devoted to Uruguay. As will be there indicated, most of them are small and, although they hold considerable promise for future development, are not likely to return an immediate profit to the Brazil Railway. The Central of Uruguay Railway is by far the most important of these lines, forming a continuous route from Montevideo to the Brazilian frontier.

The Brazil Railway acquired in 1912 a considerable interest in the shares of the Antofagasta & Bolivia Railway, most of which was resold at a considerable loss (see chapters on Chile and Bolivia). A portion of the stock disposed of by the receiver of the Brazil Railway has been used as collateral for a loan of £500,000 that matured February, 1915.

The Brazil Railway holds a majority of the shares of the Southern São Paulo Railway, which runs from Santos along the coast in a southerly direction. The line is guaranteed 6 per cent per annum on the cost of construction, payable in paper, which guaranty was stated in 1915 to be insufficient to meet all expenses of the company.

Another property under control of the Brazil Railway is the Paraguay Central Railway, which in turn controls the Asuncion Tramway, Light & Power Co. (see chapter on Paraguay for information concerning these companies). Both the railway and the tramway company are in financial difficulties and are operated by receivers. Advances made by the Brazil Railway to the tramway company are secured by mortgage.

The Brazil Railway owns a number of the shares of the Brazil Great Southern Railway (which see), a line paralleling the Uruguay River in the State of Rio Grande do Sul. This company is in financial difficulties.

Considerable investments have been made in surveys of railroads in Bolivia, which lines were found to be too expensive to construct.

PORT OF RIO DE JANEIRO—PORT OF RIO GRANDE DO SUL.

The Port of Rio de Janeiro, controlled as stated by the Sorocabana Railway, has issued bonds to the amount of 12,500,000 francs and owns valuable property that could readily be disposed of to cover more than the face value of the bonds. A Brazilian company, the Companhia Docas do Rio de Janeiro, works the port under a management contract, guaranteeing the interest on the bonds and a dividend of 6 per cent on the shares of the Port of Rio de Janeiro.

Although the receipts of the port have fallen off during the war, profits have been realized, these profits having been largely used to finance the construction of a cold-storage plant at Rio. A total of 15,931 out of 20,000 preferred and ordinary shares of the port are owned.

The Compagnie Française du Port de Rio Grande do Sul owns a contract for the construction of port works at Rio Grande do Sul, the building of jetties, etc. The work has been largely finished. The Government has given a guaranty of interest on the recognized capital and pays the company the cost of the jetties and dredging. The port company owns the tramway, electric-light, and power business in the city of Rio Grande do Sul, which will probably develop profitably. A large tract of land suitable for industrial enterprise is also owned.

SOUTHERN BRAZIL LUMBER & COLONIZATION CO.

As has been stated, the Brazil Railway owns all of the stocks and bonds of the Southern Brazil Lumber & Colonization Co., which owns large areas of timberlands and mills in the States of Parana and Santa Catharina. The principal mill is located at Tres-Barras, on a branch of the São Paulo-Rio Grande Railway running to the port of São Francisco. The mill has a capacity of 40,000,000 feet a year. It was closed down during a portion of the war period. The company owns a total of 566,475 acres of land, estimated to contain 5,000,000,000 feet of standing timber, which would run the mill at full capacity for a century. The trees are mostly pine of a good quality, and under normal conditions a ready market should be found locally and in Uruguay and Argentina.

BRAZIL LAND, CATTLE & PACKING CO.

The Brazil Railway owns all of the shares and about 90 per cent of the bonds of the Brazil Land, Cattle & Packing Co. This company holds a large area of land, which has been partially stocked with cattle. At the time of receivership this concern was in the process of formation, but the high price received for its products has aided it considerably. Inasmuch as Brazil's future as a cattle country is assured, the outlook for this company may be said to be extremely bright. The Land & Cattle Co. owns 77½ per cent of the shares of the Continental Products Co., the remainder of the shares being held by Wilson & Co., of the United States. The plant of the Products Co. is located near São Paulo. This plant is expected to prove highly profitable.

MILEAGE OF BRAZIL RAILWAY AND SUBSIDIARIES.

The mileage of the lines operated, leased, and controlled by the Brazil Railway is as follows:

Railways directly operated:	Mileage.
Cie. Auxiliaire de Chemins de Fer au Brésil	1,381.8
Sorocabana Railway	946.0
São Paulo-Rio Grande Railway	779.1
Parana Railway	252.3
Thereza Christina Railway	72.2
North Parana Railway	26.9
Total	3,458.3

Railways controlled directly or jointly or in which the Brazil Railway is interested:

Paulista Railway	226.0
Mogyana Railway & Navigation Co	1,180.0
Madeira-Mamore Railway	748.0
Total	2,154.0
All mileage	5,612.3

The above mileage does not include subsidiaries in Uruguay, Paraguay, and Bolivia.

FINANCES OF BRAZIL RAILWAY.

The capitalization of the Brazil Railway, prior to the receivership, was as follows: Six per cent preferred shares of $100, of which 150,375 are cumulative nonparticipating and 49,625 noncumulative participating, $20,000,000; common shares, par $100, $32,000,000; total stock capitalization outstanding, $52,000,000. The noncumulative participating shares are entitled to rank parri passu with the common stock for dividends in excess of 6 per cent per annum. Full dividends of 6 per cent per annum were paid on all preferred shares during 1911, 1912, and 1913. The authorized total of all stock issuable was fixed at $60,000,000, of which $40,000,000 was to have been common stock. The shares are widely distributed in France, Belgium, and Great Britain, with a few in the United States and Canada. The range of quotations on the various shares, as above, has been extremely wide, as will be shown in a subsequent paragraph.

The bonded debt of the company prior to receivership was as follows (parent company):

Securities.	Authorized.	Issued to public.
4½ per cent first-mortgage 60-year bonds.....£..	15,000,000	10,018,877
4½ per cent French franc series.....francs..	86,500,000	86,500,000
5 per cent 50-year debentures, due 1957.....dollars..	5,000,000	1,510,500
5 per cent convertible debentures.....£..	2,000,000	2,000,000
6 per cent bonds, 1913–1923.....francs..	150,000,000	105,000,000

The high and low prices since January, 1911, and the price in January, 1918, of the securities of the Brazil Railway on the London Stock Exchange are shown in the following table:

Securities.	Prices since January, 1911.		Price January, 1918.
	High.	Low.	
Common stock	121⅜	4⅞	5
Preferred (noncumulative)	130½	6	7
Preferred (cumulative)	97	10	11
4½ per cent bonds	96	22	30
5 per cent convertible debentures	97½	20	31½

In August, 1917, a plan of reorganization was announced. The capitalization at that time consisted of $20,000,000 preferred and

$32,000,000 common stock, as per table; £12,842,074 4½ per cent first mortgage 60-year bonds; 85,742,000 francs of the 4½ per cent French franc loan; £2,000,000 5 per cent convertible debentures; 146,031,500 francs of the 6 per cent 1913–1923 loan; and $1,467,100 of the 5 per cent 50-year debentures. The unfunded debt at the time of reorganization was estimated at $10,436,855. In order to obtain new capital it was decided to authorize 80,000,000 francs of new bonds to have priority over outstanding issues and to issue at once 21,060,000 francs bonds, bearing interest at 6 per cent per annum. All the old bonds of the company are to be converted into income bonds bearing the former rates of interest plus ½ per cent extra. The interest payments are to be noncumulative until the net income applicable for any issue shall have been equal to one-half of the interest on that issue for the period of five years. When the earnings shall have proved sufficient to take care of the above requirements the first half of the interest shall become cumulative, and when the interest for five consecutive years shall have been sufficient to pay the entire interest on the issue, then the full interest shall thereafter become wholly cumulative. The date of maturity on the 1913–1923 bonds and on the convertible debentures has been extended until July 1, 1969. The price realized from the sale of the 21,060,000 francs new bonds previously referred to is 95 per cent, and the maturity date of the issue has been fixed at 1942.

The plan as proposed would probably not have been put into effect had it not been for existing war conditions. The cash received by the sale of bonds amounting to somewhat less than $4,000,000 will doubtless take care of immediate requirements, and with the gradual improvement of the exchange situation in Brazil and the larger earnings realized by the company and its subsidiaries there are excellent prospects that better days are at hand. The cash requirements as estimated by the receiver were £2,400,000, half in cash and half over a period of six years.

The gross earnings of the Brazil Railway during the years 1911, 1912, and 1913 amounted to $11,714,019, $13,057,690, and $14,305,665, respectively; net earnings amounted during the same period to $5,103,308, $5,573,795, and $5,255,000, respectively. Subsequent receipts were considerably smaller. These were the earnings of lines directly operated.

The combined total gross earnings of the Mogyana and Paulista railways for 1913 were $19,233,000, as compared with $18,449,857 in 1912; net earnings for 1913 and 1912 amounted to $8,725,000 and $9,213,543, respectively. The main line of the Paulista is broad-gauge, connecting with the São Paulo Railway at Jundiahy, its terminus, and running in a northwesterly direction into a rich coffee territory. The branches are of meter gauge. The company has 92,000,000 milreis stock outstanding and pays annually from 10 to 12 per cent. Approximately £1,800,000 debentures (5 per cent) are also outstanding. About 40 per cent of the shares are held by the Brazil Railway.

The Mogyana Railway & Navigation Co. has outstanding 80,000,000 milreis stock, of which about 26 per cent is held by the Brazil Railway. Dividends of 8 to 10 per cent are usually paid, and the stock, which is listed on the São Paulo Stock Exchange, was quoted in May, 1917, at 240 milreis per 200-milreis share. The financial condition of the company is excellent. Its funded debt consists of £2,500,000 5 per cent sterling bonds "Sul Mineira Extension" due 1969 and £1,500,000 first-mortgage 5 per cent bonds, issued February, 1914, at 96 per cent. Both issues were quoted in January, 1918, at 80 per cent.

The Mogyana Railway & Navigation Co.'s line extends from Campinas, a station on the Sorocabana and Paulista Railways, northward through the States of São Paulo and Minas Geraes to Araquary, near the Goyaz frontier.

The following table shows the principal securities, leases, operating contracts, and land grants owned by the Brazil Railway and its subsidiaries, December 31, 1912:

47,308 shares of 500 francs each (out of 50,000) of the São Paulo-Rio Grande Railway Co.

20,000 preferred shares of $100 each (the whole) of the Sorocabana Railway Co.

79,360 ordinary shares of $100 each (out of 80,000) of the Sorocabana Railway Co.

£825,000 4½ per cent first debentures of the Sorocabana Railway Co.

46,635 preferred, dividend and jouissance shares (out of 82,000) of the Compagnie Auxiliaire de Chemins de Fer au Brésil.

36,011 ordinary shares (out of 72,000) of the Compagnie des Chemins de Fer Sud-ouest-Bresiliens, which owns 13,099 shares of the Compagnie Auxiliaire de Chemins de Fer au Brésil.

£900,000 6 per cent first mortgage 60-year bonds of the Madeira-Mamore Railway Co.

5,000 preferred shares of $100 each (out of 10,000) of the Madeira-Mamore Railway Co.

50,000 ordinary shares of $100 each (out of 100,000) of the Madeira-Mamore Railway Co.

157,783 shares of 200 milreis each, that is, about $64 (out of 400,000), of the Companhia Paulista de Vias Ferreas e Fluviaes.

107,093 shares of 200 milreis each, that is, about $64 (out of 400,000), of the Companhia Mogyana de Estradas de Ferro e Navegação.

20,000 preferred and 25,000 ordinary shares of $100 each (the whole of the issued share capital) of the Southern Brazil Lumber & Colonization Co.

£933,000 5 per cent first-mortgage bonds of the Southern Brazil Lumber & Colonization Co.

17,626 preferred and 38,986 ordinary shares of 500 francs each and 18,805 founders' shares of the Compagnie Française du Port de Rio Grande do Sul.

9,400 ordinary shares of 500 francs each and 10,600 "parts bénéficiaires" of the Société Générale de Construction.

15,931 preferred and ordinary shares (out of 20,000) of 500 francs each of the Compagnie du Port de Rio de Janeiro.

50,000 shares of 100 milreis each (the whole) of the Companhia dos Grandes Hoteis de São Paulo.

2,000 shares of 500 francs each (the whole) of the Companhia Estrada de Ferro Norte do Parana.

228,810 shares of $100 each (out of 250,000) of the Brazil Land, Cattle & Packing Co.

£1,437,500 5 per cent first-mortgage bonds of the Brazil Land, Cattle & Packing Co.

150,000 common shares of $100 each (the whole) of the Uruguay Railway Co.

£1,150,000 4½ per cent first-mortgage bonds of the Uruguay Railway Co.

150,000 shares of $100 each (the whole) of the Bolivia Development & Colonization Co.

Contract for the operation of the Sorocabana Railway.

Contract for the operation of the São Paulo-Rio Grande Railway, including the Parana and Thereza-Christina Railways.

Contract for the operation of the system of the Compagnie Auxiliaire de Chemins de Fer au Brésil.

Lands granted to the São Paulo-Rio Grande Railway Co., which, when surveys are completed, should comprise about 6,000,000 acres.

MADEIRA-MAMORE RAILWAY.

The Madeira-Mamore Railway passes around several series of rapids on the Madeira River and connects upward of 2,000 miles of river on the lower Amazon with an additional 2,000 miles of navigable waterways in the several important tributaries above the falls. The Brazilian Government undertook to build this line and gave the company a construction contract estimated to cover the cost. The Government of Bolivia entered into a further contract to assist the company to construct an additional section of line (which has not yet been built), in connection with which the company was to receive an important land grant in Bolivia.

The Madeira-Mamore Railway is probably the most isolated railway in the world. As stated, it affords a means of routing traffic around a chain of dangerous rapids, which prevent navigation through portions of the Madeira, Mamore, and Beni Rivers. The route followed by the railway was surveyed a number of years ago by Col. George Earl Church, an eminent American engineer, and a party of followers, a number of whom lost their lives as a result of the climate, the heat and the swampy nature of the country traversed causing great hardships. Following Col. Church's survey, numerous attempts were made to open this possible trade route. First a canal was authorized, but as this scheme did not seem feasible it was decided that a railway should be built. A company was launched in 1872 and a contract was let to the Public Works Construction Co. The latter company started work on the enterprise but was shortly compelled to give it up. In 1877 the task was again attempted, this time by P. T. Collins, of Philadelphia, who succeeded in completing about 20 miles of line and locating 40 miles additional. The difficulties of the undertaking proved too great, however, and the work had to be abandoned, most of the equipment brought into service being left in the swamps.

In the year 1903 the treaty of Petropolis between Brazil and Bolivia imposed upon the former, in exchange for territories granted by Bolivia, a guaranty that the railway would be constructed. Brazil subsequently let a contract to Joachim Catranby, who in turn transferred it to the present owners of the line.

The Madeira-Mamore Railway has its terminus at Puerto Velho, from which point it extends southwestward and southward through the forest and jungle following the route of the river. The railway en route crosses a number of small villages, and towns have sprung up. The railway passes opposite Villa Bella, Bolivia, near which town the Mamore and Beni Rivers unite to form the Madeira. Each of these rivers has its sources in the Bolivian Andes—the former in the Department of La Paz and the latter in Cochabamba. The present southern terminus of the line is at Guajara Miriam, on the Mamore River, beyond which point the river is navigable for some hundreds of miles. From Guajara Miriam the railway has been surveyed to Riberalta on the Beni River, a distance of approximately 62 miles. This extension, if completed, will open a trade route of importance to eastern Bolivia. At some future date it is expected that a railway authorized by the Bolivian Government (probably an extension of the Yungas Railway, now building) will connect the plateau cities of La Paz, Oruro, etc., and will provide an eastern outlet for the growing trade of the highlands.

The climate of the district traversed by the railway is particularly unfavorable, and the 226 miles of line were built under difficulties that seemed almost unsurmountable. The cost greatly exceeded all estimates. The rubber industry, upon which the property depended for its initial traffic, is undergoing a severe depression (although conditions are slightly improving) and only a fraction of the amount of rubber expected is finding its way over the line, with the result that the railway in 1915 was only just earning its operating expenses. It is, as indicated, an important strategic line, and the development of even one important industry, such as hardwoods or some mineral deposit, would have an important effect on the earnings of the line and the value of its securities.

The capitalization of the company consists of $1,000,000 preferred and $10,000,000 common stock (this being held one-half by the Brazil Railway and one-half by the Port of Para Co.) and of the following bonds: £1,400,000 6 per cent 60-year first-mortgage bonds guaranteed principal and interest by the Port of Para Co. and secured on the lease of the railway and by a first charge on certain specific property; £1,600,000 5½ per cent 60-year first-mortgage bonds, secured by same property as the 6 per cent bonds, but guaranteed principal and interest by the Brazil Railway.

The lease that the Madeira-Mamore Railway holds from the Government for the operation of the railway was to be for 60 years from January 1, 1912, for which consideration the railway would pay to the Government 5 per cent of the gross operating revenue until 1931, 10 per cent from 1932 to 1951, and 20 per cent thereafter until the expiration of the lease; also, if more than 12 per cent of the recognized capital is earned in any year one-fifth of the balance would accrue to the Government. The high prices for the issues since 1911 were 105½ for the 6 per cent bonds and 96 for the 5½ per cent bonds, the low prices being 27¼ and 26½, and the price in January, 1918, approximately 35 and 34½, respectively.

Gross earnings of the property for 1911, 1912, and 1913 totaled $706,905, $1,552,056, and $1,701,335, respectively. Net earnings for 1912 and 1913 were $579,395 and $812,335. No later figures are available.

Concessions held by the railway company permit the management to develop the agricultural and mineral resources of more than 1,000 square miles of territory in the State of Matto Grosso (this concession expires in 1936), and the company may also purchase at a nominal sum a vast area of lands in Bolivia.

GREAT WESTERN OF BRAZIL RAILWAY.

This network of railway lines is under British control and management. The port of Pernambuco is the central terminus, and lines extend northward along the coast and also into the interior, reaching Natal, Parahyba, Jaragua, etc. The States of Pernambuco, Alagoas, Parahyba, and Rio Grande do Norte are traversed. In the normal year 1912, 2,674,351 passengers were carried, as against 2,341,511 during 1911. The freight handled consisted of 443,416 tons of sugar, 111,552 tons of cotton and cotton seed, 97,521 tons of stone, 87,316 tons of firewood and timber, 33,943 tons of mandioca, 68,697 tons of miscellaneous freight, and 71,658 head of cattle. The mileage totals 1,010, a large portion of which is leased from the Brazilian Government for 60 years from 1901. The capitalization of the company consists of the following issues:

Securities.	Amount outstanding.	Par value.	High price since 1911.	Price January, 1918.
Ordinary stock	£1,250,000	£10	12	[a] 5
6 per cent preference	1,000,000	10	12½	[b] 7⅛
6 per cent debentures (permanent)	306,250	100	139	99
4 per cent debentures	1,615,000	100	97	67
Total	4,171,250			

[a] 50 per cent. [b] 71 per cent.

Gross receipts of the railway during the past several years have been as follows: 1911, £644,888; 1912, £684,985; 1913, £759,000; 1914, £641,600; 1915, £515,400; 1916, £581,422; 1917, £736,914. During this period the mileage in operation has increased from 934 to 1,010. In 1917 the operating expenses were £507,602, as against £407,247 in 1916, and the net receipts were £229,312, as against £174,175 in 1916. Adding other income and deducting interest, sinking fund, reserves, etc., the amount to be carried forward at the end of 1917 was £20,577. The operating ratio was 68.9 per cent. For the 30 weeks ended July 27, 1918, gross receipts totaled £486,900, an increase of £113,500 as compared with the similar period in 1917. During a normal year, 1913, the net receipts of the railway were £260,093, as compared with fixed charges to the amount of less than £100,000.

Dividend payments on both classes of stock amounted to 6 per cent per annum for a number of years to and including 1913. In 1914 and later years no dividends were paid on the ordinary stock. In November, 1914, dividends were suspended on the preference stock and had not been resumed up to December, 1917.

BRAZIL NORTHEASTERN RAILWAY.

This company operates approximately 472 miles of railway in the State of Ceara, its principal terminus being the port of Fortaleza or Ceara. Further lines are partly constructed; the work is being carried on through the agency of the Brazilian Government, having been assigned to the South American Construction Co. The State of Ceara is about the size of Illinois and contains approximately 1,000,000 inhabitants. Cotton is the principal commodity handled. The number of passengers handled annually is about 300,000. The railway is leased by the Government to the company until 1970, but may be expropriated in 1940 under certain conditions and upon terms not unfavorable to the company. The capitalization of the company consists of £350,000 £1 shares, £70,000 5 per cent debenture stock (prior lien), and £341,215 6 per cent first debenture stock (original issue £350,000), the last-named issue being redeemable at 110 on or before February 1, 1933, or by purchase of £4,000 or more per annum up to 110 for sinking fund.

At a meeting of debenture holders held in January, 1915, it was decided that the coupon due August, 1914, and subsequent coupons should not be paid until commencing not more than six months after the close of the European war. The payments on the prior lien 5 per cent bonds were also postponed. These bonds were to have matured in 1916. The 6 per cent first debenture stock is listed in London and sold as high as 102 during the past six years. In 1915, the quotation for the issue was 36, and no later price has been recorded.

The highest net receipts earned by the railway totaled £50,886, these results being accomplished in the year 1912. Gross receipts during 1911, 1912, and 1913, respectively, were £157,038, £179,091, and £188,400. Fixed charges average approximately £40,000 per annum.

NORTHWESTERN OF BRAZIL RAILWAY.

Most of the railway mileage included in the above table has been previously described in this chapter. In addition to these lines, the Northwestern of Brazil Railway, 935 kilometers (581 miles), the outgrowth of a rather pretentious scheme, begins at Bauru on the Brazil Railway system and follows the valley of the Tiete River to Itapura. The line crosses the State of Matto Grosso and reaches the Bolivian frontier, opening up a vast tract of virgin country for the immigration that will probably follow the conclusion of the European war. The traffic on this railway has not yet developed large proportions, but its future will doubtless be more successful. The 20,000,000 milreis shares and two issues of 5 per cent debentures, 40,000,000 and 17,500,000, are listed on the Rio de Janeiro Stock Exchange. A number of the debentures are held in France. The railway will eventually develop considerable traffic from the upper portion of the Paraguay River and from eastern Bolivia. The line may eventually connect with a railway projected to run from Puerto Suarez, Bolivia, to connect with the Antofagasta & Bolivia Railway at Cochabamba or Potosi. The construction of the Bolivian enterprise, however, will probably be long delayed. Bauru, the eastern terminus of this railway, is located on a branch of the Paulista Railway, and also on a line operated by the Brazil Railway as owner of the Sorocabana Railway.

BRAZIL GREAT SOUTHERN RAILWAY AND EXTENSIONS.

The Brazil Great Southern Railway operates 110 miles of railway in the State of Rio Grande do Sul, the terminals being located at Quarahim, on the frontier with Uruguay, and at Itaqui (see Brazil Great Southern Railway Extensions (Ltd.) concerning the operations of an extension from Itaqui to São Borja, 77 miles). A company known as the Quarahim Bridge Co. (see a later paragraph, as well as chapter on Uruguay) operates a bridge between the southern terminus of the Brazil Great Southern Railway and the Northwestern Railway of Uruguay's terminus in the Republic of Uruguay. The bridge company is controlled jointly by the two railway companies.

During a period of 26 years there has been no dividend payment on either class of the company's stock, and upward of 154 per cent back dividends remain due on the 7 per cent cumulative preference shares, of which £225,000 are outstanding. There are also outstanding: (1) £125,000 deferred shares, £84,700 first-charge 6 per cent mortgage debentures, the interest on which has been in arrears since February 1, 1914 (the original issue of this loan was £250,000); (2) £94,969 6 per cent mortgage debentures that matured 1911 and were extended until November 19, 1918, on payment to the bondholders of £2 10s. per bond (interest has been in default on these debentures since February, 1914); (3) 6 per cent permanent debenture stock, in default since January, 1914; (4) 7 per cent flood loan, to the amount of £43,000, the interest on which is in default since April 1, 1913.

A receiver was appointed for the company in February, 1914. Most of the deferred shares were held at the time of receivership in the interests of the Brazil Railway.

The gross earnings of the railway for 1916 totaled £23,664, an amount not equal to operating expenses.

The 6 per cent mortgage debentures sold in January, 1918, at 28, this comparing with 104, the high price since 1911. The 6 per cent debenture stock was quoted 20–24 January, 1918 (high since 1911, 103 per cent).

The Brazil Great Southern Railway Extensions (Ltd.), of which mention has been made, operates an extension of the Brazil Great Southern Railway's line from Itaqui to São Borja, 77 miles. The concession is for 60 years from 1910, the line reverting to the Brazilian Government at the end of this period. The authorized capitalization is £100,000, of which £25,007 is outstanding. There are also £43,700 6 per cent debentures outstanding (£100,000 authorized), of which £20,000 are held by the Brazil Great Southern Railway. Gross receipts in 1914 amounted to 97,011 milreis, in 1915 to 118,950 milreis, and in 1916 to a somewhat larger sum. The outstanding shares of this company are presumably held by the Brazil Great Southern Railway, to whom they were originally transferred.

QUARAHIM INTERNATIONAL BRIDGE CO.

The Quarahim International Bridge Co., the £10,000 shares of which are held by the Brazil Great Southern Railway and the Northwestern of Uruguay Railway, has constructed an international bridge for interchange of traffic between the two lines. The bridge is 700 yards in length. The debt of this company consists of £100,000 5 per cent sinking-fund debentures, to be redeemed through a sinking fund by 1972. The total amount of this issue authorized is £125,000, and it bears the joint guaranty as to principal and interest of the two companies owning the stock. The debentures were originally issued in 1912 at 97½ per cent. Interest is payable semiannually in March and September, and the sinking fund, which commences operation in 1920, will acquire bonds up to par. In January, 1918, the price was about 70 per cent.

STATE-OWNED RAILWAYS IN BAHIA.

Under date of July 19, 1917, Consul Edward Higgins reports as follows concerning State-owned railways in Bahia:

> The State-owned Nazareth Railway is in a very prosperous condition. The revenues, expenses, and profits for the past two years follow: Revenues—1915, $268,694, and 1916, $333,508; expenses—1915, $193,337, and 1916, $260,043; profits—1915, $75,357, and 1916, $73,465.
>
> The extension of the line from Jaguaquara to Jequié, in the center of the State, is well advanced, and part of it may be opened before the end of 1917. The starting point of this railway is the town of Nazareth, on the Jaguaripe River, which can be reached only by small steamers, and the goods transported on the railway are subjected to considerable handling before they arrive at the port of Bahia. To obviate this the State government has contracted for the construction of a branch line connecting Nazareth with Salinas da Margarida or any other suitable place on the coast near Bahia City.

The Santo Amaro Railway serves the best sugar district of the State. The accompanying figures give a good idea of its condition: Revenues—1915, $91,097, and 1916, $119,549; expenses—1915, $79,699, and 1916, $90,743; profits—1915, $11,398, and 1916, $28,806.

This railroad needs rolling stock and locomotives. In 1916 the State bought 15 ballast cars for it. The Government plans the extension of this line to Coração de Maria and several branches to other parts of the sugar district of Santo Amaro.

The Eastern Central Railway has shown successive deficits for many years. No statistics are available as to its financial standing. Steps are being taken to better its condition.

The main line of the Nazareth Railway extends from Nazareth to Toca da Onca, 196 kilometers (122 miles), with a 29-kilometer (18-mile) branch, São Miguel to Amargosa. The line was completed in 1913. The maximum gradient is 2.75 per cent. Daily passenger-train service in each direction is operated on the main line and branch.

The Santo Amaro Railway, which, as stated, serves the best sugar district of the State, runs from the town of Santo Amaro to Jacu, 34 kilometers (21 miles), with a short extension to Bom Jardin.

The Western Central Railway extends from Santo Amaro to Agua Comprida. Traffic is light, the passenger traffic being handled by four trains a week in each direction.

RAILWAYS OF THE STATE OF PARA.

The Braganca Railway, a State line, runs from the Port of Para (Belem) to Castanhal, Livramento, Braganca, Benjamin Constant, etc., approximately 316 kilometers (196 miles), including branches. The railway was originally authorized in 1870 and completed in 1907. At one time it was under the control of a British company, but later was acquired by the State. This narrow-gauge railway is comparatively well built and sufficiently equipped. Presumably the most important of the short branches operated is that extending from Igarapeassu to San Antonio de Prata, approximately 21 kilometers (13 miles). Short extensions are planned.

The Tocantins Railway is in operation from Alcobaca, a port of some size, to Breu Branco, 43 kilometers (27 miles); the total length in 1916 was 56 kilometers (35 miles). A considerable mileage is either partly constructed or projected, this company's program being very comprehensive.

RAILWAY DEVELOPMENT IN STATE OF SÃO PAULO.

The State of São Paulo contained as of November, 1917, approximately 4,000 miles of railway lines, or nearly one-quarter of the entire railway mileage of Brazil. The following table indicates the development of the mileage, earnings, tonnage, etc., since 1895:

Items.	1895	1905	1910	1915
Miles in operation	1,798	2,346	2,998	3,924
Receipts	$11,545,000	$21,105,000	$28,150,000	$31,192,000
Expenses	$5,720,000	$11,400,000	$14,325,000	$17,150,000
Passengers	4,268,083	4,604,082	7,240,313	7,824,000
Animals	166,022	217,108	310,496	250,300
Luggage ... tons	41,858	47,702	67,670	73,000
Goods ... do	2,159,085	2,986,511	4,584,540	4,718,000

OTHER BRAZILIAN RAILWAYS.

In addition to the various railways thus far reviewed, there are numerous lines of more or less importance, serving different sections of the Republic. Some of these lines are under the control and management of the Government or of different States; others are State-owned and leased to private companies; and the rest are directly operated by private concerns. A brief description of certain of these lines follows:

The Compagnie Chemins de Fer de l'Est Brésilienne was established in Paris in 1911, to carry out a comprehensive scheme sanctioned by the Government to take over and extend various railway lines in the State of Bahia and in neighboring States. The lines were largely to be operated under a 60-year lease from the Government. The system was to comprise the Central of Bahia Railway, the Bahia & São Francisco Railway, the São Francisco Railway, and other lines, with various extensions to link together existing railways. Among the important sections are (1) the line extending from São Felix to Monte Cruzeiro, Queimadinhas, and Machado Portello, 268 kilometers (167 miles); (2) Cachoeira to Feira, 45 kilometers (28 miles); (3) Bahia to São Francisco, Algoinhas Timbo, Barracao, and Aracaju, 431 kilometers (268 miles); (4) São Francisco to Bomfim and Joazeiro, 453 kilometers (281 miles); (5) Ponta d'Areia to Teophilo Ottoni, 378 kilometers (235 miles). The system has shown evidences of fair earning power, and a number of the lines are handling a fair sugar traffic.

The Victoria & Minas Railway (Cie. des Chemins de Fer de Victoria à Minas), a French company, operates important mileage. This line is capitalized at 40,000,000 francs, divided into 80,000 shares of 500 francs par value. A sale of these shares was recorded prior to March 31, 1917, on the Stock Exchange at Rio de Janeiro at 60 milreis per 500-franc share. There are also outstanding three issues of debentures. amounting to 70,000,000 francs, 15,000,000 francs, and 25,000,000 francs, respectively. The interest rate on each issue is 5 per cent, and the bonds are issued in denominations of 500 francs each. The issues are dated 1902, 1909, and 1911, respectively. Most of the bonds were floated in Paris, the 1911 loan having been publicly offered by the Crédit Mobilier Français. Lines extend from Victoria (São Carlos) to São Escura, 444 kilometers (276 miles), and from Curralinho, a station on the Central of Brazil Railway, to Diamantina, 148 kilometers (92 miles). The railway was completed from São Carlos to Lajao, 277 kilometers (172 miles), in 1908; to Derribadinha, 345 kilometers (214 miles), in 1909; to Nack, 424 kilometers (263 miles), in 1911; and to São Escura in 1912. It was proposed to carry the line to Itabira, located about 183 kilometers (114 miles) beyond São Escura. It was expected that, since the richest iron ore deposits in Brazil were to have been reached, sufficient development work would be carried on to assure 3,000,000 tons of ore as freight annually. A portion of the iron country is now reached by the railway, and in time a substantial traffic in the ore should be secured. In 1910 contracts were signed for the electrification of the system, and money was borrowed in France for this purpose.

The traffic during the early years of the Victoria & Minas Railway has probably not come up to expectations. An important country is traversed, and opportunities for development in various lines are most excellent. The European war has stayed for a time the rapid expansion of this territory, but new settlers and additional capital will follow the termination of the conflict. The railway gives promise for the future.

The Goyaz Railway, capitalized at 28,329,000 francs shares of a par value of 500 francs each, as well as 25,000,000 5 per cent debentures (par 500 francs), was destined to connect the city of Goyaz, capital of that State, with Rio de Janeiro. The railway as built thus far is in two sections—Formigo to São Pedro de Alcantara, 239 kilometers (149 miles), and Araguary to Roncador, 211 kilometers (131 miles). The total mileage projected was about 1,000. The company was originally organized for the purpose of exploiting a concession granted in 1890 for the construction of a railway from Catalao to Palmas, State of Goyaz. The plans laid for the construction of the line have several times been altered. Thus far plans have been carried out as above mentioned, with an additional short branch, Goyandira to Catalao, 23 kilometers (14 miles).

SHARES AND DEBENTURES OF IMPORTANT RAILWAYS.

There follow tables indicating the total capitalization and debenture capital of important railways whose securities are listed at Rio de Janeiro:

SHARES.

Railways.	Capital.	Par value.	Latest quotation.
	Milreis.	*Milreis.*	*Milreis.*
Cabo Frio	500,000	100	....
Campos do Jordão	3,000,000	200	....
Colonização Porto do Souza Manhuassú	2,000,000	200	....
Ferroviaria Brasileira	[a] 2,000,000	[a] 500	....
Goyaz	[a] 28,329,000	[a] 500	28.5
Federaes B. R. Sul Mineira	20,000,000	200	28
Itabapoana	50,000	200	....
Leopoldina Railway	[b] 5,500,000	[b] 10	76
Minas de S. Jeronymo	5,000,000	50	28.5
Muriahé	1,000,000	200	....
Nordeste de Minas	500,000	100	....
Noroeste do Brasil	20,000,000	200	24
Norte do Brasil	12,500,000	[c] 200	21
Norte de Minas	10,000,000	200	....
Norte do Paraná	440,000	20	....
North Alagoas Railway	3,000,000	200	....
Paracatú	10,000,000	200	....
Paulista	80,000,000	200	....
Pelotas	5,000,000	500	....
Rio Doce-S. Matheus	[a] 6,000,000	[a] [d] 500	....
S. Paulo-Rio Grande	[a] 25,000,000	[a] 500	32
S. Luiz a Caxias	2,000,000	200	....
Santa Barbara	2,500,000	200	....
Theresopolis	3,000,000	200	....
Victoria & Bahia Railway	[b] 500,000	[b] 20	....
Transbrasileira	[a] 30,000,000	[a] 500	....
Viaçãe Serrana	3,200,000	200	....
Victoria a Minas	[a] 40,000,000	[a] 500	60
Victoria (Brazil) Railway	[b] 280,000	[b] 20	....

[a] Francs. [b] Pounds sterling. [c] 140 milreis paid in. [d] 150 francs paid in.

DEBENTURES.

Railways.	Amount.		Par value.		Interest rate.	Latest quotation.
	Milreis.	*Francs.*	*Milreis.*	*Francs.*	*Per cent.*	*Milreis.*
Agricola de Santa Barbara	2,500,000		100		8	
Campos do Jordão	4,000,000		100		8	
Federaes Brasileiras, R. Sul Mineira		50,000,000		500	5	
Ferroviaria Brasileira		15,000,000		500	5	
Goyaz		25,000,000		500	5	
Minas de S. Jeronymo	[a]1,500,000		100		7	105
Noroeste do Brasil		40,000,000 17,500,000		500 500	5 5	
S. Paulo-Rio Grande		280,711,509		500	5	200
Theresopolis	1,000,000		200		8	200
Viação de S. Paulo-Matto Grosso	3,000,000		100		8	
Victoria a Minas		70,000,000 15,000,000 25,000,000		500 500 500	5 5	

[a] The amount outstanding is 1,492,000 milreis.

MILEAGE OF BRAZILIAN RAILWAYS.

Of the 25,506 kilometers (15,849 miles) of railways in operation within the Republic of Brazil in the year 1915, approximately 21,587 kilometers (13,414 miles) were operated by private parties, largely through lease from the Federal Government or from various States, and 3,919 kilometers (2,435 miles) directly by the State. The railway mileage operated by a majority of the lines is shown in the following table (the Brazil Railway's leased and controlled lines are shown separately):

	Miles.
Brazil, Central of (Government)	1,230
Bahia	1,071
Blumenau (German line)	44
Brazil, Great Western of (British)	1.004
Brazil, Northeastern of (British)	449
Brazil, Northwestern of	581
Brazil Great Southern Railway	[a] 109
Brazil Great Southern Railway Extensions	[a] 76
Brésil, Cie. Auxiliaire de Chemins de Fer au	[a] 1,355
Leopoldina Railway (British)	1,763
Madeira-Mamore	226
Mogyana Railway & Navigation Co	1,081
Norte do Parana	25
Parana	[a] 252
Paulista	721
São Paulo-Rio Grande	1,100
Sorocabana	876
São Paulo	153
Serrinha	31
State of Bahia Southwestern	[a] 62
Thereza-Christina	81
Braganca (State)	[a]196
Nazareth Railway	[a]140
Santo Amaro	[a] 27
Victoria-Minas Railway	[a] 373
Goyaz Railway	[a] 280
Tocantins-Araguaya	35
Total	[a]13.341

[a] Approximate mileage.

Although, as indicated above, railway progress in Brazil has been substantial, much additional development will probably follow the conclusion of the war in Europe.

PUBLIC UTILITIES.

BRAZILIAN TRACTION, LIGHT & POWER CO.

The largest and most important public-utility company in Brazil is the Brazilian Traction, Light & Power Co. (Ltd.), a Canadian corporation, registered in 1912 as a consolidation of the Rio de Janeiro Tramway, Light & Power Co. (Ltd.), the São Paulo Tramway, Light & Power Co. (Ltd.), and the São Paulo Electric Co. The parent company at the time of consolidation assumed all the debts, guaranties, and other responsibilities of the companies acquired.

The direct capitalization of the Brazilian Traction, Light & Power Co. consists of: (1) $7,500,000 three-year secured notes, due November 1, 1919, behind which is deposited, as collateral, $15,004,450 bonds of underlying companies (interest payable May and November); (2) $10,000,000 cumulative 6 per cent preference shares, on which full dividend payments are being made; and (3) $106,417,800 ordinary shares. Dividend payments on the ordinary shares have been as follows: 1912, 1½ per cent; 1913 and 1914, 6 per cent; 1915 and 1916, 4 per cent; in March, 1917, 1 per cent was paid (quarterly rate); in June, 1917, the dividend was passed.

Income accounts of the company during recent years have shown the following results:

Items.	1914	1915	1916
Revenues from securities owned and from other sources	$8,058,818	$5,612,876	$6,019,473
Surplus applicable for dividends	7,686,532	5,394,802	5,674,642
Preferred dividends (6 per cent)	600,000	600,000	600,000
Ordinary dividends	6,257,119	4,249,380	4,251,488

Under the plan of consolidation effected in 1912 stocks of the old companies were exchanged for ordinary shares of the holding company as follows:

Companies.	Old companies' stocks.	New stock issued in exchange.
Rio de Janeiro Tramway, Light & Power Co	$45,000,000	$72,000,000
São Paulo Tramway, Light & Power Co	10,000,000	27,500,000
São Paulo Electric Co	5,000,000	5,000,000

RIO DE JANEIRO TRAMWAY, LIGHT & POWER CO. (LTD.).

The Rio de Janeiro Tramway, Light & Power Co. (Ltd.), which is controlled by the Brazilian company, as previously mentioned, through ownership by the latter of approximately 449,304 of the 450,000 outstanding shares, is in turn virtually a holding company. It owns the whole or a large part of the stocks of some 14 companies

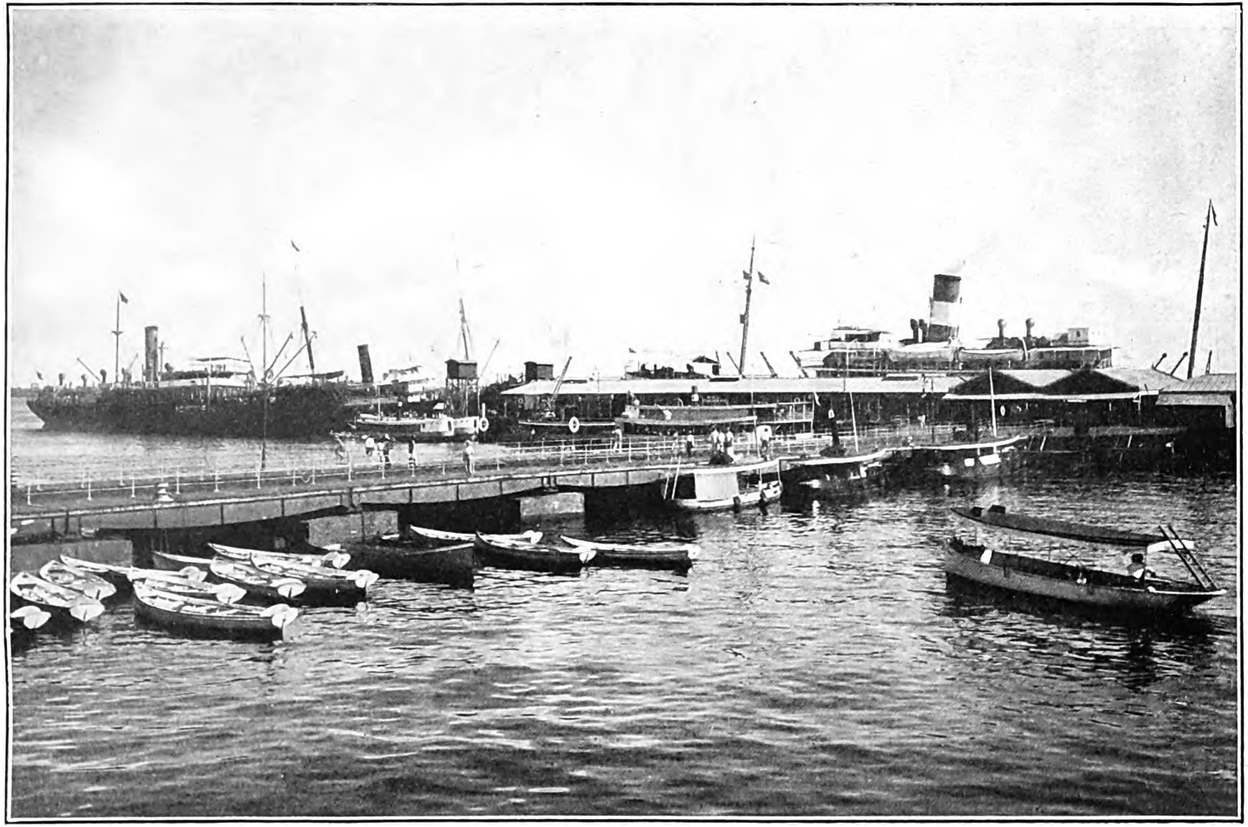

FIG. 11.—FLOATING QUAYS AT MANAOS, BRAZIL.

operating traction lines, gas, electric-lighting, and power systems, telephone lines, etc. The traction lines handle both urban and interurban traffic and have an approximate mileage of 237, all electrically operated. The car mileage for 1916 was 24,667,154 and the total number of passengers carried was 198,677,975. A total of 1,183 cars of various kinds were in service, as of December 31, 1916; also 836,269 incandescent lamps (419,413 in 1912), 10,860 arc lamps (9,084 in 1912), and 31,551 telephones. Light and power consumers numbered 50,210.

In addition to the $45,000,000 stock, on which 5 per cent per annum is paid, the Rio de Janeiro company had outstanding, in 1916, $50,627,867 bonds, including $25,000,000 first gold 5's due 1935, as well as £5,266,000 fifty-year mortgage 5's due 1958, interest April and October. These bonds are listed on the stock exchanges of Toronto, Montreal, London, and Brussels.

The Jardim Botanico Tramways, about 80 per cent of the £1,400,000 stock of which is owned by the Rio de Janeiro company, has outstanding an issue of £1,400,000 first sterling 5 per cent bonds, guaranteed by the parent company. These bonds are due in 1951, and interest is payable January and July. They were quoted 79 to 82 in January, 1918.

The gas and electric franchises of the company expire in 1945; telephone franchises expire partly in 1928, although some of the franchises are perpetual; tramway franchises extend until 1970.

SÃO PAULO TRAMWAY, LIGHT & POWER CO.

The São Paulo Tramway, Light & Power Co. was incorporated in 1899 to acquire important tramway and lighting systems in and near the city of São Paulo. Of the outstanding 100,000 shares of stock of this company, 99,814 are held by the Brazilian Traction, Light & Power Co. Dividends on these shares have usually been at the rate of 10 per cent per annum. The funded debt of this company amounts to approximately $10,000,000, this including £821,917 perpetual consolidated debenture stock and $6,000,000 first gold 5 per cent bonds due 1929, listed in London, England, and Toronto, Canada. An additional issue of £1,000,000 general bonds due 1963 has been authorized, and £514,000 are deposited as part collateral for the notes of the Brazilian Traction, Light & Power Co. The company operates approximately 141 miles of electric traction lines, and owns 359 passenger and 92 freight cars. A total of 55,154,564 passengers were carried in 1916, the car mileage being 10,153,657. As of December 31, 1916, there were 30,251 consumers of light and power. Incandescent lights in use totaled 332,392, as compared with 124,004 in 1912.

SÃO PAULO ELECTRIC CO.

The São Paulo Electric Co., the entire 50,000 shares ($5,000,000) of which are held by the Brazilian Traction, Light & Power Co., has a bonded debt of £2,000,000 first gold 5's due 1962, interest payable January and July, which are listed on the London Stock Exchange. This company owns an important and extensive hydroelectric property, having a contract to furnish the São Paulo Traction, Light & Power Co. with 15,000 horsepower and to supply electric lighting and power to certain towns and cities in the State of São Paulo. Three and one-half miles of tramway are also operated and nine cars owned.

Separate statements of earnings of the Rio de Janeiro Traction, Light & Power Co. (Ltd.), the São Paulo Traction, Light & Power Co. (Ltd.), and the São Paulo Electric Co. are not made public.

OTHER ENTERPRISES CONTROLLED BY BRAZILIAN TRACTION, LIGHT & POWER CO.

In addition to its holdings of shares in the companies heretofore described, the Brazilian Traction, Light & Power Co. owned, through a subsidiary, approximately 95 per cent of the shares of the Companhia Telephonica do Estado de São Paulo and the Companhia Rede Telephonica Bragantina. A new company known as the Rede Rio de Janeiro & São Paulo Telephone Co., the $5,000,000 stock of which is owned by the Brazilian company, is the subsidiary holding the above-mentioned shares, as well as the shares of two other telephone companies in the territory served. A telephone line, 300 miles in length, extending from Rio de Janeiro to São Paulo, was under construction in 1917 and has presumably been completed.

INCREASED RECEIPTS—PRICES OF SECURITIES.

In November, 1917, it was estimated that the gross receipts of the Brazilian Traction, Light & Power Co. for the calendar year 1917 would be approximately 8,000,000 milreis in excess of 1916, and that operating income totals would increase 2,500,000 to 3,000,000 milreis.

Securities of the parent and subsidiary companies have been quoted as follows:

Securities.	High price since 1911.	Price January, 1918.
Brazil Tramway, Light & Power Co.:		
Ordinary stock	94	44
Preference stock	102½	89
Notes	99	87
Rio de Janeiro Traction, Light & Power Co. first 5 per cent bonds	107½	86
São Paulo Tramway, Light & Power Co.:		
5 per cent first bonds	108	87
5 per cent perpetual debentures	111	74
São Paulo Electric Co. 5 per cent 50-year bonds	97	76

RIO DE JANEIRO CITY IMPROVEMENT CO.

The drainage concessions for the city of Rio de Janeiro are held by the Rio de Janeiro City Improvement Co., a British company, incorporated 1862. These concessions expire in 1947 and the properties revert to the city without compensation. The company receives 60 milreis (at an exchange rate of 19d.) per annum for each house drained. The subscribed capital of the company is £1,192,775 in shares of £5 and approximately £537,100 5 per cent debentures maturing in annual installments. Dividends for 1905 to 1913, inclusive, were at the rate of 5 per cent per annum; in 1914, 2½ per cent was paid, and in 1915, 7½ per cent. The company's debentures were quoted in 1918 (January) at 84½, as compared with 103, the high price since 1911. The ordinary stock was quoted in January, 1918, at approximately 3½ (69s. per £5 share), this comparing with 4⅝, the high price since 1911.[1]

TRAMWAYS AND ELECTRIC PLANT IN CURITIBA.

The South Brazilian Railways Co. (Ltd.) owns tramways and electric-lighting plant in the city of Curitiba (population 50,000), State of Parana. The tramway lines are slightly more than 16 miles in length. A power house is owned. This is a French company, registered in 1910. The State of Parana may purchase the tramway system under certain conditions favorable to the stockholders. The capitalization of the company consists of £300,000 shares of £4 par (100 francs); also £289,160 5 per cent debentures, first series, interest April and October, maturity 1968, secured by a first charge on the tramway undertaking, together with £372,800 5 per cent debentures, second series, due 1968, secured by a first charge on the electric-lighting and power undertakings. There were also outstanding in 1914 certain loans, and the company met with some difficulties, owing to the war, in arranging to meet its financial requirements. Receipts for 1915 were 1,161,407 milreis.

WATER SERVICE AND DRAINAGE SYSTEM OF SÃO PAULO.

The water service and the drainage system of the city of São Paulo were originally held by the Cantareira Water Supply and Drainage Co., of São Paulo. This company was established in 1878 and in 1888 floated an issue of £350,000 5 per cent debenture bonds in London, approximately £87,000 of which remain outstanding, the rest having been redeemed through sinking-fund operations. The property was acquired in 1892 by the State of São Paulo, the State assuming responsibility for the principal and interest.

CITY OF SANTOS IMPROVEMENT CO.

The water, gas, electric, and tramway franchises for the city of Santos are held by the City of Santos Improvement Co., a British company, registered in 1880. The franchises vary in length, the exclusive gas franchise expiring in 1920, water in 1930, electric lighting in 1924, the works remaining the property of the company in perpetuity. The tramway lines are 38 miles in length, of which 28½ miles are under perpetual franchises and the remainder under franchises expiring in 1923 and 1938. The capitalization of the company consists of £800,000 ordinary stock, £200,000 6 per cent cumulative preference stock, and two debenture issues, the first debentures being outstanding to the amount of £125,500 (original issue £200,000) and tramway debentures to the amount of £175,200. Dividends on the ordinary stock have varied from 3 per cent to 7½ per cent per annum, being 6 per cent in 1917 (see Appendix, p. 504). The ordinary shares (£10 par) were quoted at 6 in January, 1918, this comparing with 13¾, the high price since 1911. The preference shares (£10) were quoted at 7½ in January, 1918, and the two debenture issues at 88 and 89, respectively.

PUBLIC-UTILITY COMPANIES IN CEARA.

The Ceara Gas Co. (Ltd.), a British corporation, owns extensive gas works in the city of Ceara, its concession extending until 1958.

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[1] For 1917 the net profits totaled £84,632; the amount brought forward was £19,082, making £103,664 surplus, of which £25,000 was transferred to reserve. The dividend for the year was 5 per cent (less tax) on the £1,192,775 shares.

The company has outstanding £10,000 10 per cent first preference shares (par £10); £9,420 10 per cent second preference shares (par £10); also £30,000 fully paid (£10) ordinary shares and £4,266 in ordinary shares, £8 paid. There are also outstanding £25,000 6 per cent debentures, interest payable January and July and principal payable 1927. Full dividends have been regularly paid on the preference shares. The payments on the ordinary shares during recent years have been at the following rates: 1907–8 and 1908–9, 8 per cent each; 1909–10 and 1910–11, 9 per cent each; 1911–12 and 1912–13, 10 per cent each; 1913–14, 6 per cent; 1914–15 and 1915–16, none. The company had a reserve account of £24,000 in 1916, and carried forward to the 1917 fiscal year £3,329. The London office of the company is at 9 Queen Street Place, E. C.

The Ceara Tramways, Light & Power Co. (Ltd.) was incorporated in 1911 to take over a 10-mile mule tramway system, receiving a concession from the municipality of Ceara for 76 years from 1911, to electrify the existing system and to extend the line about 4 miles, as well as to establish and work an electric lighting and power plant. At the end of the concession the properties revert to the municipality without remuneration. The authorized capitalization is £400,000, one-half to be ordinary stock and one-half 7 per cent preference stock. At the close of 1916, £91,428 ordinary stock was outstanding, none of the preference stock having been issued. Approximately £320,000 5 per cent first debenture stock (authorized £400,000) has been issued, of which £250,000 was offered in 1912 by Parr's Bank, at 92½, with a 10 per cent ordinary stock bonus. The surplus of receipts over expenditures for 1915 totaled 243,323 milreis. Owing to the war and the drop in exchange, the sinking fund of 1 per cent was suspended temporarily and there was a slight adjustment of interest payments. The property has now been practically completed and, with the exception of a small tramway extension, has been placed in full operation.

PERNAMBUCO TRAMWAYS & POWER CO.

The Pernambuco Tramways & Power Co. (British) operates the tramways, gas works, and electric-lighting plant in the city of Recife (Pernambuco). This company has acquired the shares of several utility companies, including the Brazilian Street Railway (Ltd.). Capitalization consists of: £400,000 6 per cent cumulative preference shares (par £1; quoted 12s. January, 1918); £816,030 ordinary shares (par £1; quoted 6s. 6d. January, 1918); £1,022,900 5 per cent debentures, principal payable 1953 at par, by means of sinking fund, and interest payable January and July (quoted 66½ per cent January, 1918); also a loan of £84,840 secured by debentures. Interest has been regularly met on outstanding obligations and a surplus earned. The balance carried forward to the 1916 account amounted to £14,770; later information is not available. The total length of tramways in operation is approximately 78 kilometers (48 miles). In 1917 a dividend of 3½ per cent was paid on the preference stock.

The Brazilian Street Railway Co., the securities of which have been mostly acquired by the Pernambuco Tramways & Power Co., is capitalized as follows: £32,537 5 per cent cumulative preference shares, par £1; £87,000 ordinary shares, par £1; and £45,950 5 per cent debentures. The preference dividend was paid in full until 1914, and a small rate was annually maintained on the ordinary shares until that date. A very large proportion of the security holders have exchanged their stocks and debentures, as stated above.

PUBLIC-UTILITY COMPANIES IN MANAOS.

The Manaos Tramways & Light Co. (Ltd.) furnishes the light and power to the city of Manaos and operates about 23 miles of tramway lines (electric). A description of the company will be found in the Appendix (p. 507). The concession extends for 60 years from 1908, at the end of which time the property reverts to the State of Amazonas without payment. There are outstanding £300,000 shares of £1 and £300,000 first-charge debentures. Interest has been met on the debentures, and on the stock 3 per cent was paid in 1911–12 and 4 per cent in 1912–13. No subsequent dividends had been paid to the close of 1916. In January, 1918, the £1 stock was quoted at 4s. and the debentures at 68.

The waterworks and sewerage plant of the city of Manaos were constructed by the Manaos Improvements Co. Its concession, which was for 60 years from 1906, has been the subject of continuous litigation and contention. The company has outstanding £44,800 prior-lien bonds, £500,000 6 per cent first debentures, and £150,000 second debentures (held by bankers), also £200,000 7 per cent cumulative preference stock and £200,000 ordinary stock. The preference stock has not received dividends since 1908, these dividends remaining due and unpaid. The debenture holders have agreed to defer receiving interest until six months after the conclusion of the European war. The preference shares of £10 par were quoted in 1914 at £3 10s.; no later quotation is available. The 6 per cent debentures were quoted at 55 in 1914.

PARA PUBLIC WORKS CO.—PARA ELECTRIC RAILWAYS & LIGHTING CO.

The Para Public Works Co. (see Appendix) holds the telephone concession in the city of Belem (Para) and formerly held the public-cleaning contract. The latter was canceled in 1912 upon payment by the city of £275,200 municipal bonds. There is £60,000 ordinary stock and £2,000 deferred stock outstanding. The net profit for 1917 was £7,456, and, including the amount brought forward, the available surplus was £9,785. A dividend of 8 per cent was paid on the £60,000 ordinary shares.

The Para Electric Railways & Lighting Co. (Ltd.), a British company registered in 1905, operates the tramways and electric lighting system of the city of Belem (Para) and, through control of the Para Gas Co., the gas lighting. The tramways are operated by electricity and are 34½ miles in length. The outstanding capital consists of £325,000 6 per cent cumulative preference stock (par £5), £390,000 ordinary stock (par £5), and £668,400 5 per cent first debenture stock (original issue £700,000), interest payable June and December 1 and principal repayable through a cumulative sinking fund of ½ per cent per annum. Full dividends have regularly been paid on the preference stock, and during the years 1909–10 to 1912–13, inclusive, 10 per cent was annually paid on the ordinary stock. In 1913–14 the rate was 6 per cent, and in the two subsequent years the rate was 5 per cent per annum.

The securities of this company, during recent years, have been quoted as follows:

Securities.	High price since 1911.	Price January, 1918.
First debentures	103¼	75
6 per cent cumulative preference [1]	5⅞	4½
Ordinary shares [1]	8	4

[1] Par £5.

The concession of the company is for 99 years from December, 1905, at the end of which period the property is to pass into the possession of the municipality without compensation. At the close of 1915, the company held reserves for contingencies to the amount of £50,522, reserves for depreciation and renewals of £96,545, and carried forward to 1916 the sum of £18,935. Preference shares receive their dividends semiannually, March and September.

SÃO PAULO GAS CO.

The São Paulo Gas Co., an Anglo-Canadian enterprise, controls the gas works and system operating in the city of São Paulo. The company's concession expires in 1950, the works, however, remaining the property of the company after that period with the privilege of continuing business under the common law. The authorized capitalization is £500,000, of which £425,000 is now outstanding, consisting of £150,000 6 per cent cumulative preference shares, par £10, and £275,000 ordinary shares of £5 each. Full preference dividends have regularly been paid for many years, and the ordinary shares from 1905 to 1908, inclusive, received 8 per cent per annum; in 1909 and 1910, 9 per cent each; 1911, 12 per cent; 1913, 6 per cent; and in later years 6½ per cent per annum. The preference shares sold at £8 in January, 1918, as compared with the high price since 1911 of 12¼.

In addition to the share capital, this company had outstanding, in 1917, £125,000 5 per cent debentures due 1928, the company having the power to redeem them at par on six months' notice. Interest on these debentures is payable January and July 1. These debentures, which are issued in £50 denominations, were quoted January, 1918, at 42, this comparing with the high price since 1911 of 51. The general reserve fund of the company in 1915 amounted to £125,000. This company is an old one, its incorporation dating from the year 1869.

BAHIA TRAMWAYS, LIGHT & POWER CO.

A British company known as the Bahia Tramways, Light & Power Co. formerly held the tramway and lighting contract for the city of Bahia. In 1913, under an agreement, the property was sold to the city, the company receiving bonds of the municipality. Subsequently the interest and sinking-fund payments on the municipal bonds went into default. The capitalization of the former company consisted of $7,386,300 5 per cent first-mortgage debentures and $3,500,000 stock. It is hoped that some portion of the debentures will be repaid, but the stock will probably be valueless.

MINAS GERAES ELECTRIC LIGHT & TRAMWAYS CO.

The tramway, electric light and power, and telephone service of the city of Bello Horizonte is furnished by the Minas Geraes Electric Light & Tramways Co. (Companhia de Electricidade e Viação Urbana de Minas Geraes), a local company incorporated in 1912. The franchise held by the company is for 53 years and covers also territory suburban to the city. The rental paid by the company to the State of Minas Geraes for the exclusive public-utility privilege of the district is £17,000, minimum. The capitalization of the company is equivalent to $500,000 shares and the outstanding balance of £120,000 5 per cent first-mortgage bonds, par £20 to £100, issued in Great Britain, these being guaranteed as to principal and interest by the State of Minas Geraes (interest payable April and October and principal due finally in 1953 through 1 per cent annual cumulative sinking fund). The original offering price for these bonds was 90½ (1913). Dividends on the stock of the company for 1913, 1914, and 1915 were 8½ per cent, 10 per cent, and 12 per cent, respectively. In 1915 the company's reserve fund amounted to 49,672 milreis.

TRAMWAY SYSTEM IN NICTHEROY.

The tramway system of the city of Nictheroy, capital of the State of Rio de Janeiro, is owned by the Companhia Cantareira e Viação Fluminense, which also operates a line of ferry boats running between Nictheroy and Rio de Janeiro. A total of 45,599 of the 50,000 shares (par 200 milreis) of the company are owned by the Leopoldina Terminal Co. (Ltd.), a British company (see p. 147). The tramway system is 72 kilometers (45 miles) in length.

PUBLIC UTILITIES IN RIO GRANDE DO SUL.

The tramway, electric light, and power business of Rio Grande do Sul is controlled by the Port of Rio Grande do Sul Co., which was an undertaking of the Brazil Railway (see p. 151). The public utilities are expected to develop profitably.

OTHER COMPANIES.

Among the important local companies yet unmentioned are the following:

(*a*) Companhia Telephonica do Parana, furnishing telephone service for a considerable section of the State of Parana. This company is capitalized at 1,200,000 milreis shares and 1,000,000 milreis 7 per cent debentures due 1938. These debentures were originally issued at 90.

(*b*) Campineira de Tracção, Luz e Força, of Campinas (Campinas Traction, Light & Power Co.), which operates the public utilities in the important city of Campinas, State of São Paulo. This city has a population of more than 50,000 and is the center of an important coffee-producing district. The company has a capitalization of 4,000,000 milreis shares (200 milreis par), together with an issue of 4,000,000 milreis 7 per cent debentures, of which 3,725,000 debentures were in circulation as of the year 1916. Interest on these debentures is payable January and July 25, their final maturity date is 1940, and their original offering price was 93. The quotation in 1916 was 90. Campinas is located on the Paulista Railway, about 65 miles from São Paulo.

In addition to the cities previously mentioned as having public utilities, there are numerous cities, towns, and villages provided with lighting and water facilities. Not a few cities have tramway systems, among those not already mentioned being Aracaju, State of Sergipe (population 35,000); Campos, State of Rio de Janeiro (population 50,000); Juiz de Fora, State of Minas Geraes (population 35,000); Maceio, State of Alagoas (population 40,000); Parahyba, State of Parahyba do Norte (population 23,000); Uba, State of Rio de Janeiro (population 37,000); and Victoria, State of Espirito Santo (population 20,000). The above list is by no means complete.

There is an important cable and telegraph system operating between Para and Manaos, this being owned by the Amazon Telegraph Co., a British concern. The concession extends for 50 years from 1895 and there is a subsidy of £17,500 per annum extending for 40 years from the commencement of operations. The Government may purchase the property on terms that are favorable to the stockholders. The authorized and outstanding capitalization of the company is £250,000 shares of a par value of £10, and there are also outstanding £262,400 of an original issue of £300,000 debentures, bearing interest at 5 per cent per annum (issued in 1909 at 98 per cent), a cumulative sinking fund of 2½ per cent per annum retiring the bonds prior to July 1, 1935. In the event of the purchase of the property by the Brazilian Government the issue is to be retired at 105 per cent. There is a general reserve of £40,000 and a reserve for renewal and maintenance of cable steamers of £14,500, and a balance carried forward in 1916 of £6,806. The dividends paid during recent years have been as follows: 1910–11, 4 per cent (initial dividend); 1911–12 and 1912–13, 4½ per cent free of income tax; 1913–14, 3 per cent, less tax; 1914–15, none; 1915–16, 3 per cent; 1916–17, 4 per cent. The debentures were quoted at 89 in January, 1918, and the shares at 5 (£10 par).

In addition to the various companies described in preceding paragraphs, there are numerous other enterprises of similar character, mostly under local management, providing light and power and in some instances tramway service to other cities, towns, and villages in the Republic. Although numerous towns and cities remain without proper public-utility service, it can not be said that Brazil is backward in this field. In the State of São Paulo alone there are no fewer than 160 cities and localities provided with electric lighting facilities, which are also extended to many of the coffee and agricultural estates in the outlying districts.

POSSIBILITIES OF WATER-POWER DEVELOPMENT.

The powerful waterfalls, of which Brazil has so many, assure the future of hydroelectric development, and as the great country grows in wealth and population there is little doubt that the demand for hydraulic power for lighting, manufacturing, and other purposes will substantially and steadily increase. It is calculated that the hydraulic power in the State of São Paulo is not less than 3,000,000 horsepower, of which not more than one-twelfth has been utilized. It has been stated that the immense Guayra Falls, in the interior, at present almost unknown to the outside world, are more than 300 feet in height, about 2 miles in extent and discharge about 13,000,000 cubic feet of water every minute. The hydraulic force has been calculated at 65,000,000 to 80,000,000 horsepower. Iguassu Falls, which is partly Brazilian, has a hydraulic force, it is stated, of nearly 15,000,000 horsepower. Other falls, rapids, and cascades exist by the thousands, yet scarcely a score are being used to furnish power.

SECURITIES QUOTED ON STOCK EXCHANGE AT RIO DE JANEIRO.

There follows a list of important public-utility companies whose securities are quoted on the Stock Exchange at Rio de Janeiro:

SHARES.

Companios.	Capital.	Par value.	Paid in.	Reserves, etc.	Last sale
	Milreis.	*Milreis.*	*Milreis.*	*Milreis.*	*Milreis.*
Brazileirs de Energia Electrica	30,000,000	200	200	994,619	....
Brazilian Traction, Light & Power	4,000,000	200	200	1,188,8[illegible]0	....
Carioca	2,500,000	100	100	1,33[illegible],538	....
Carris Urbanos	6,000,000	100	100	1,902,189	....
Electricidade e Lavoura	120,000	100	100	....	....
Electricidade e Machinas	300,000	200,	200	....	....
Electricidade de São Paulo e Rio	1,200,000	200	200	....	....
Electricidade e Viação Urbana de Minas Geraes	1,500,000	200	200	277,061	220
Fluminense de Força e Luz	500,000	100	100	....	60
Força e Luz Cataguazes-Leopoldina	400,000	100	40	....	....
Força e Luz de Campos	2,450,000	100	100	141,499	60
Força e Rede Jahu	205,000	200	200	....	....
Força eLuz N. Fluminense	550,000	200	200	22,657	210
Forca e Luz de São Paulo	2,500,000	200	200	395,023	....
Força e Luz de Palmyra	200,000	100	100	16,728	....
Força e Luz Rio Preto	345,000	100	100	....	100
Força e Mineração Sta. Anna	45,000	100	100	....	....
Industrial de Electricidade	2,000,000	200	200	45,366	20
Jardim Botanico	21,000,000	200	200	4,314,253	175
		200	100	....	90
Luz Força de Minas Geraes	800,000	200	200	....	....
Mineira de Electricidade	2,500,000	200	200	....	....
Mineira de Energia Electrica	200,000	200	200	....	....
Paranaense de Electricidade	650,000	100	....	....	....
Paulista de Electricidade	2,000,000	200	200	8,190	....
Paulista de Força e Luz	2,000,000	200	200	....	....
Pernambuco	a 2,000,000	100	100	38,583	....

a 800,000 milreis outstanding.

DEBENTURES.

Companies.	Total issue.	Par value.	Interest rate.	Last sale.
	Milreis.	*Milreis.*	*Per cent.*	*Milreis.*
Electricidade de São Paulo e Rio	1,200,000	200	8	....
Fluminense de Força e Luz	300,000	100	10	102
Força e Luz Cataguazes-Leopoldina	300,000	200	8	....
Força e Luz de Campos	a 400,000	100	8	....
Força e Luz de Jahu	90,000	200	12	....
Força e Luz de Palmyra	150,000	100	8	....
Força e Luz Ribeirão Preto	100,000	200	12	....
Força e Luz Ribeirão Preto (2)	120,000	200	10	202
Industrial de Electricidade	2,000,000	200	8	35
Paulista de Força e Luz	b 1,500,000	200	8	....

a 374,200 milreis outstanding. b 1,458,400 milreis outstanding.

PORT AND HARBOR IMPROVEMENTS.

The rapid development of the resources of Brazil and the consequent increase in foreign trade have necessitated extensive improvements of the ports and harbors, which exist in large numbers along the vast Atlantic seaboard and in the rivers. Twenty years ago harbor facilities were almost negligible. To-day port works have been constructed in many large harbors and elaborate plans have been laid for further improvements. Some of these ports were constructed for private companies to operate; others are Government enterprises.

PORT OF PARA.

The most northerly port handling ocean traffic is the port of Para (Belem), located on the southern side of the Amazon delta. The works were constructed by the Port of Para Co., a Farquhar-Pearson enterprise. A receiver was appointed for the company in 1914. The capitalization of the company at the time of receivership consisted of $10,500,000 6 per cent noncumulative participating preferred shares ($17,500,000 authorized) and $13,000,000 common stock ($15,000,000 authorized). The approximate bonded debt consisted of £3,600,000 5 per cent first-mortgage 50-year bonds and £2,500,000 5 per cent 60-year first-mortgage bonds (a large portion of the balance of the £5,000,000 bonds authorized were also pledged as collateral for loans). The company further guaranteed as to principal and interest £1,000,000 6 per cent bonds of the Madeira-Mamore Railway (see p. 156). Some of the properties controlled by the Port of Para Co. were as follows:

Upward of 7,500 feet of quays and wharves for ocean-going and river steamers.

About 84 acres of reclaimed land behind the quay walls, on which are situated 15 warehouses, having an area of more than 380,000 square feet, together with electric cranes, etc.

An electric power house.

An administration office building, completed in August, 1913.

A complete ship-repairing yard with two floating docks in deep water, each capable of lifting 1,800 tons dead weight and placed at the end of a steel jetty connected with large machine shops, foundry, etc. These shops also serve three slipways, each capable of handling vessels up to 800 tons.

A coal depot and depot for inflammables; also three steel oil-storage tanks with a capacity of 24,000 tons of fuel oil.

Other works wholly or partly carried out consisted of:

(1) Three miles of entrance channel. dredged to the depth of 30 feet below low water, giving access to the quays. The channel has been buoyed with 20 illuminated buoys and with other buoys enabling the quays to be approached by night.

(2) A new boulevard 6,000 feet in length by 98 feet in width.

(3) A training bank on the side of the channel to guide the flow of the river in order to maintain the depth of water in the approach channel.

(4) Customhouse, post office, and telegraph office.

The Port of Para Co., in 1911, acquired control of the Amazon River Steam Navigation Co. (Ltd.), which carried an annual subvention of about $335,000 and which was considered to be a most important factor in the development of river navigation. In 1912 the Amazon River Navigation Co. acquired control of the Companhia Navegação do Amazonas and amalgamated the fleets of the two companies. The Port of Para Co. made large advances to the steamer lines.

In addition to the port works and the river steamer lines, the Port of Para Co. organized the Amazon River Land & Colonization Co., with the object of developing lands suitable for agriculture and grazing. Funds were advanced by the parent company to cover preliminary expenses of the Colonization Co.

The cost of construction and equipment of the Port of Para and the other port developments of the company was stated in 1913 to amount to $50,693,206.

PORT OF MANAOS.

The harbor works of the port of Manaos were constructed and have been operated by the Manaos Harbor (Ltd.). The concession was dated 1902, and the time limit fixed was 60 years. Valuable warehouses are also owned by the company. The capitalization consists of £300,000 7 per cent cumulative preference shares and £200,000 ordinary or founders' shares; also £350,000 5 per cent debentures, due 1936, interest payable June and December (issued in 1908 at par; quoted 58 January, 1918), and £141,800 sinking fund second debentures to be retired annually until 1945. Dividends on the preference shares were paid in full, 1903 to 1913, inclusive, being passed at the outbreak of war in 1914. Dividend rates on the ordinary shares during the same period have been as follows: 1903–4, 10 per cent (13 months); 1904–5, 15 per cent; 1905–6, 15 per cent; 1906–7 and 1907–8, none; 1908–9 to 1911–12, 7 per cent each; 1912–13 to 1915–16, none.

The harbor works at Manaos, which is located on the Amazon River, 924 miles above Para and near the junction with the Madeira River, consist of a fine stone wall over 1,500 feet in length, large floating docks joined to the wall by a bridge some 550 feet in length, 16 electrically equipped warehouses, etc. The company constructed at its own expense a very substantial customhouse and presented it to the Republic. The depression in rubber dating from a period not long before the outbreak of the European war caused a decrease in the revenues of this company, which previously had enjoyed considerable prosperity.

PORT ANTONIO.

There is another inland port in the Amazon district, at Port Antonio, on the Madeira River, 1,800 miles from the Atlantic Ocean. This was laid out by the Madeira-Mamore Railway (which see). The water at this point is of sufficient depth to accommodate ocean-going steamers. The Madeira-Mamore Railway commences at this point and routes traffic around the dangerous falls and rapids of the Madeira and Mamore Rivers and affords connection with the rubber districts of eastern Bolivia and western Brazil.

PORTS BETWEEN PARA AND PERNAMBUCO.

The harbors between Para and Pernambuco (Recife) have been developed only in a limited manner and, owing to lack of railways running to the interior, have not assumed the importance that they will some day doubtless attain. These ports include:

(1) São Luiz (population 50,000), which is the capital of the State of Maranhão. This city is located on an island and is somewhat difficult to reach owing to shifting sands. Plans are under way to dredge this harbor and to construct a floating dock.

(2) Tutoya, an excellent port with, however, but little traffic, located at the mouth of the Parnahyba River, which runs southward into the State of Piauhy.

(3) Amarracao, of little commercial importance.

(4) Camocim, a railway terminal in the State of Ceara and the outlet for good country. Projects have been laid for a 500-foot sea wall and for a floating dock.

(5) Fortaleza, a city of 50,000 inhabitants and capital of the State of Ceara. Improvements are to be effected through dredging and the construction of a breakwater.

(6) Natal, capital of Rio Grande do Norte, which has been improved and will probably assume considerable commercial importance.

(7) Cabedello, chief city of Parahyba do Norte, the harbor of which is to be bettered through dredging and the wharves of which are to be enlarged.

PORT OF PERNAMBUCO.

Pernambuco, the nearest Brazilian port to Europe and one of the largest and most important cities in the Republic, is not sufficiently provided with harbor improvements. A large sum has been voted for the construction of a protecting sea wall, a stone jetty, quays, etc. This work will, it is estimated, cost between $25,000,000 and $30,000,000.

PORTS OF JARAGUA AND ARACAJU.

Jaragua, in Alagoas, and Aracaju, in Sergipe, are the only ports of any size between Pernambuco and Bahia. Port works are projected at the former place to cost, it is estimated, $6,318,000, the work to include a long breakwater. Concessions were given some time ago to improve the channel at Aracaju and otherwise better harbor conditions, but this concession has been canceled, it is said, the proposition remaining open.

PORT OF BAHIA.

The concession for the construction of port works at Bahia was granted some years ago to the Companhia Concessionaria das Docas do Porto da Bahia (Port of Bahia Co.), incorporated in 1902. The capitalization of the company consists of 50,000,000 milreis shares and £3,000,000 5 per cent bonds, repayable by sinking fund 1923 to 1972 and a lien on the port works, etc. A total of 70 per cent of the net revenues of the port was assigned to service of the issue, and if this proved insufficient 2 per cent of the import duties of the port were likewise to be assignable. The bonds were originally issued £2,500,000 in Paris and £500,000 in London. Interest was suspended at the outbreak of the European war. The work has not been fully completed. The net revenues for 1914 were 1,395,974 milreis and for 1915 2,962,202 milreis. The high price for the bonds since 1911 was 97, and the quotation early in 1917 was 46.

The bay on which Bahia is situated is about 25 miles wide and 20 miles in depth and provides good anchorage for large steamers. When the docks, etc., are fully completed the port is certain to make very substantial progress, as it is the center for a rich and productive territory. Additional railways will further increase production and assure larger revenues to the enterprise. The port works may be purchased by the Government in 1922, upon payment of a fixed sum sufficient to assure profit to the then owners.

PORT OF VICTORIA.

Victoria, capital of Espirito Santo, is the only place of importance between Bahia and Rio de Janeiro. Some day it will doubtless become a large port, destined to receive large shipments of minerals, especially if the iron deposits of Minas Geraes are fully exploited. A quay more than half a mile in length is projected at this place, in addition to other works, the estimated total cost to exceed $4,000,000. Small ports, capable of taking care of vessels of moderate size, exist between Victoria and Rio de Janeiro, these including São João da Barra at the mouth of the Parahyba River, Imbetiba, on the Leopoldina Railway, and Cabo Frio.

PORT OF RIO DE JANEIRO.

Much has been done to improve the magnificent harbor of Rio de Janeiro, largely through the proceeds of loans and through import taxes. The Brazil Railway Co. also constructed important works at the port, these being described on page 150. There is an extensive quay of granite construction 2¼ miles in length, a great floating dock that will berth vessels of more than 20,000 tons, a floating crane, etc. Large warehouses have also been provided.

PORT OF SANTOS.

Santos, the port of São Paulo and the greatest coffee-shipping place in the world, has been greatly improved during recent years. The principal docks are owned by the Santos Dock Co. (Companhia Docas de Santos), an important local company capitalized at 60,000,000 milreis shares and 60,000,000 6 per cent debentures, interest January and July. These debentures, which are issued in 200-milreis denominations, recently sold at 206 milreis (103 per cent) and rank among the best Brazilian investments. The 200-milreis shares were quoted at Rio de Janeiro May, 1917, at 451 milreis (225½ per cent). Large dividends have been paid on these shares, and the company has enjoyed a most successful career.

PORTS BETWEEN SANTOS AND RIO GRANDE DO SUL.

Between Santos and Rio Grande do Sul there are several small ports. The most important of these are: (1) Paranagua, which is to be improved and which is the terminus of the important railway running to Curitiba and Ponta Grossa. (2) São Francisco, destined to assume great importance as a port for shipment of lumber and other products and a railway terminus for lines in Santa Catharina. Plans have been laid, but thus far only partly carried out, to make this port the terminus of a through railway system to Iguassu Falls and thence to Asuncion, Paraguay. (3) and (4) Florianopolis and Laguna, both with great future prospects and both in need of betterments.

In the chapter on "Railway development" (see Brazil Railway), the port works at Rio Grande do Sul have been discussed briefly. These undertakings carried out by the Brazil Railway were very extensive. Port improvements at Porto Alegre and Pelotas are also being made or are projected.

STEAMSHIP LINES.

There are several international and coastal lines flying the Brazilian flag. By far the most important of these lines is the Lloyd Brasileiro, which is virtually a Government line and which operates to various foreign ports. The Companhia Nacional de Navegação Costeira, controlled by Lage Bros., a local concern, and the Companhia Commercio e Navegação are also of considerable importance. There follows a table published in the Diario Official just before the outbreak of the war showing the tonnage, etc., of Brazilian ships:

Companies.	Capital.	Number of ships.	Gross tonnage.	Receipts.	
				Passengers.	Freight.
	Milreis.			*Milreis.*	*Milreis.*
Lloyd Brasileiro	6,000,000	70	106,204	7,565,138	11,252,040
Navegação do Amazonas, Tocantins, Araguaya	12,500,000	1	126	22,713	24,264
Companhia de Navegação Rio Parnahyba	150,000	5	1,062	151,340	280,644
Companhia de Navegação Alto Parnahyba	250,000	4	146	1,628	37,854
Empreza de Navegação Baixo S. Francisco	....	3	166	11,859	175
Empreza de Navegação Bahiana	3,806,000	15	3,572	262,379	576,584
Empreza de Navegação Viação de S. Francisco	250,000	12	267	156,903	340,613
Navegação do Sul do Rio de Janeiro	400,000	....	....	11,977	100,313
Navegacão do Ibucuhy e Uruguay	550,000	4	752	36,877	70,771
Companhia Commercio e Navegação	5,000,000	18	39,357	....	5,504,383
Companhia Nacional de Navegação Costeira	3,500,000	14	14,454	1,380,422	4,384,313
Empreza de Navegação Espirito Santo, etc	200,000	1	900	4,714	169,035
Companhia de Navegação S. João da Barra	1,347,000	5	2,250	3,448	999,074
Empreza Navegação Hoecke & Mello & Co	....	3	1,184	108,279	392,213
Jose Barbosa da Silva	....	7	1,808	287,382	798,658
Navegação Mello, Frotas	....	7	1,750	136,108	456,926
Companhia Pernambucana	....	4	707	53,603	242,220
Total	....	173	174,705	[a] 10,194,770	[b] 25,630,080

[a] 79,127 first-class and 123,713 other passengers handled.

[b] 1,935,868 tons handled.

The Lloyd Brasileiro has at the present time 66 ships with a gross tonnage of 126,000. Certain of its bonds have been issued abroad, guaranteed by the Government of Brazil and virtually recognized as external obligations (see the account of government loans). The company during the past two years has earned considerable profits.

The Companhia Nacional de Navegação Costeira confines its operations to coastwise passenger and freight service. Its capitalization is shown in a subsequent table.

The Companhia Commercio e Navegação confines its operations to freight traffic, its ships touching at most of the local ports. Twenty steamers are operated at the present time, with a gross tonnage of 55,500.

The Empreza de Navegação Bahiana (Bahia Navigation Co.) owns 16 steamships and 1 sailing vessel. The company has in recent years usually reported deficits. The withdrawal of the annual Government subsidy of $75,000 in 1915 and 1916 considerably increased the annual deficit. Operating results during the years mentioned have been as follows (United States currency):

Item.	1915	1916
Expenses	$489,880	$563,050
Receipts	309,238	376,520
Operating deficits	180,642	186,530

The Federal Government is said to be negotiating for the purchase of this line.

The Empreza de Navegação e Viação de São Francisco is owned by the State of Bahia. This line, which operates on the São Francisco River and its tributaries, tapping rich areas, receives an annual subvention of $50,000 from the Federal Government. Gross receipts from operation in 1916 totaled $154,088, Government subsidy $50,000, operating expenses $138,943, and profit $65,045.

The following tables indicate the capitalization of various companies, together with latest quotation for shares and debentures and other information. The data are taken from the record of securities quoted on the Stock Exchange of Rio de Janeiro on March 31, 1917:

SHARES.

Companies.	Capital.	Par value.	Funds and reserves.	Last sale.
	Milreis.	*Milreis.*	*Milreis.*	*Milreis.*
Navegação Rio São Paulo	400,000	200	....	....
Brasileira de Navegação	500,000	200	44,595	....
Cantareira e Viação Fluminense	10,000,000	200	387,169	215
Commercio e Navegação	10,000,000	200	8,023,804	....
Nacional de Navegação Costeira	11,000,000	200	5,947,028	....
Navegacão do Amazonas	15,500,000	200	....	....
Rio Grandense	600,000	100	....	200
São João da Barra e Campos	1,346,800	[a] 200	269,498	170
Lloyd Brasileiro	13,500,000	200	....	....

[a] 80 milreis paid in.

DEBENTURES.

Companies.	Issued.	Par value.	Interest rate.	Last sale.
	Milreis.	*Milreis.*	*Per cent.*	*Milreis.*
Commercio e Navegação	6,000,000	200	7	185
Nacional de Navegação Costeira	[a] 17,150,000	200	7	200
Navegação Rio de Janeiro	300,000	200	8	....

[a] The amount outstanding is 12,993,000 milreis.

MINING ENTERPRISES.

Although Brazil contains enormous quantities of minerals of various kinds, the only three varieties extensively mined at present are manganese, gold, and diamonds.

MANGANESE INDUSTRY.

Manganese has taken the lead by a very large margin, the exports of this metal (largely because of the war) having expanded by leaps and bounds. During the first six months of 1917, 245,088 tons were exported, valued at approximately $5,500,000. During the calendar year 1916 503,000 tons were exported, valued at $7,084.954. For the first six months of 1914 shipments of manganese totaled 85,500 tons, valued at approximately $600,000. The total exports from Rio de Janeiro during 1914, 1915, and 1916 amounted to 144,734, 309,886, and 432,435 tons.

The manganese mines are variously located in the States of Minas Geraes, Matto Grosso, Bahia, and elsewhere, the deposits located in

Minas occupying a position of considerable importance, owing to their accessibility to the port of Rio de Janiero. The ore reserves are very large, the Urucum deposit in Matto Grosso containing, it is estimated, 30,000,000 tons of undeveloped ore, the Quelez deposits in Minas Geraes containing 5,000,000 tons, and other developed and un developed properties large amounts.

The average composition of the dry Brazilian ore is: Metallic manganese, 52 to 53 per cent; iron, 3 to 3½ per cent; silica, 1½ to 2 per cent; phosphorus, 0.03 to 0.04 per cent.

American interests have recently entered the Brazilian manganese field. Most of the remaining capital invested is of local origin.

The transportation of manganese ore has proved a remunerative source of income to the Government's Central of Brazil Railway.

The Quelez ore deposit of which mention has been made is located about 300 miles from Rio de Janeiro, while the Urucum deposit, in Matto Grosso, is about 18 miles from Corumba, the head of navigation of the Paraguay River, and is no great distance from the Northwestern of Brazil Railway. One of the deposits in the State of Bahia is at Villa Nova, about 300 miles from the port bearing the same name, while another deposit is located at Nazareth, only a few miles from the city. The Miguel Burnier deposit in Minas Geraes, which is in limestone, is said to be 6 miles in length running from east to west. Extraction costs at this mine exceed costs at the Quelez and other deposits.

The future of the manganese industry is assured, provided better transportation facilities are secured. The ore from the mines at Nazareth, Bahia, which are under American management, has to be taken by lighter to the port of Bahia and there transshipped for America or Europe. The insufficient number of lighters and ships is greatly curtailing the production of this mine, while lack of railways and good roads prevents the expansion of those in the interior.

GOLD MINING.

Gold, the mineral that served as a magnet to attract early settlers to Brazil, is found in many of the States. There are two important mines now in operation, both under British ownership and management. These are worked by the St. John del Rey Mining Co. (Ltd.) and the Ouro Preto Gold Mines of Brazil (Ltd.). The St. John del Rey mine is located at Villa Nova de Lima, State of Minas Geraes, and is a very old property, having been worked since the year 1830. Between 1835 and 1862 the production of the mine was 59,098,654 troy pounds of gold valued at approximately $11,000,000. In 1849, 69,446 tons of ore were produced and the results from crushings were £38,136 profits. In 1865 the profits were £80,438 and the production 78,883 tons. In 1886 a cave-in made it impossible to operate the mine. The property was reconstructed in 1887, and the present company was registered July 24, 1888. The capitalization consists of £100,000 10 per cent noncumulative first preference stock, £100,000 10 per cent noncumulative second preference stock (unissued), and £546,265 ordinary stock (£600,000 authorized); £1,800 7 per cent bonds matured March, 1918. The par value of shares is £1. Full dividends of 10 per cent per annum have been paid on the preference stock, and during recent years the rates on the ordinary stock have been: 1903–4 and 1904–5, 5 per cent; 1905–6, 2.92 per cent; 1906–7, 2½ per cent; 1907–8, 5 per cent; 1908–9, 6.67 per cent; 1909–10, 8.33 per cent; 1910–11, 9.17 per cent; 1911–12 to 1916, 10 per cent per annum.

The production of this mine from 1837 to the caving in of the shaft in 1886 was 58½ tons of refined gold. The property employs from 800 to 1,000 workers and supports a population of nearly 10,000. During a recent year 192,600 tons of ore were treated and 1,145,788 oitavos of gold produced (1 oitavo equals 3.586 grams), an average of 6.438 oitavos per ton. The percentage of the gold contents of the ore recovered was 92.40. The depth of the shaft thus far driven exceeds 1 mile, and the property is still far from being exhausted.

The report of the company for the year ended February 28, 1917, stated that since March 1, 1901, the sum of £567,283 had been taken out of profits for capital works and redemption of bonds. The total value of assets of the company was stated as £1,507,492. The gross receipts from operation for the year ended February 28, 1917, were £450,280 and the operating and development expenses were £291,096, the balance of profits being £159,185. Including other income the total net receipts were £172,387 and the surplus £132,637. Of this total sum, £50,000 was transferred to capital works account and £10,000 to reserve fund. After transferring these sums and after paying the 10 per cent dividend on the outstanding stocks and £800 donated to war funds, there was carried forward the sum of £4,057.

The tonnage crushed at the mill during 1916–17 was 187,400, the amount realized averaging 50s. 3½d. per ton. The decrease in tonnage crushed as compared with 1915–16 was 5,100, the loss in tonnage being offset by the production of a larger percentage of gold.

A quotation of 17s. 9d. for the £1 ordinary shares, as of January, 1918, compares with an approximate price of 16s. at the closing of the London Stock Exchange, July 27, 1914. The preference shares (£1) were quoted 25s. 6d. January, 1918.

The Ouro Preto Gold Mines of Brazil, an Anglo-French company, operates the Passagem mine, located about 5 miles from Ouro Preto, Province of Minas Geraes. The property is an old one, having been worked at the commencement of the nineteenth century. The present company was incorporated in 1914, as a reconstruction of a company with a similar name, registered 1893. There are £60,000 10 per cent and participating preference shares outstanding, which rank pari passu with the £40,000 ordinary shares for dividends in excess of 10 per cent. The amount of gold produced in 1914 was £114,569; in 1915, £120,591; and in 1916 slightly more than £120,000.

The first stamp mill, placed in operation in Brazil (1819) was used at this mine. The average thickness of the ore lode was for many years 3 meters, but this has since narrowed to about 2½ meters. The ore is crushed to pass through 30 mesh screenings, and about 12 tons of water are used to 1 of ore. Complete treatment takes three days. The company owns an electric plant, which furnishes light to the surface workings and buildings and to the village of Marianna. About 1,000 men are usually employed. The company was recently stated to have options on the Maquine and Santa Ana mines located near the Passagem mine, both properties being believed to hold considerable promise.

There are several other British and French companies engaged in gold mining, none of which have as yet attained the results shown by the St. John del Rey and Ouro Preto properties. There are a number of small properties that are now being worked or have been in the past, and considerable additional development is expected to follow the improvement in the transportation systems of the Republic. The Congo Socco mine in the Itabira district may be mentioned as important among the earlier producers.

Concerning gold deposits in Brazil, a recent review in the London Times stated as follows:

> In nearly all States of Brazil gold has been discovered and is being extracted. The important auriferous lodes in Brazil are grouped around three mountain chains, which, so to speak, form the skeleton of the country.
>
> The Mantiqueira chain, which comes from the State of São Paulo and is detached from the Espinhaco chain, which crosses the State of Minas from north to south, penetrates into the State of Bahia and ends in that of Pernambuco. In the second place, the watershed which separates the waters of the River São Francisco from those of the River Plate serves as a boundary between the States of Minas and Goyaz, and continues into the State of Piauhy and ends in that of Ceara. A third line extends along the right of the Rivers Paraguay and Araguay. It is to the latter that the chain of Parecis in the State of Matto Grosso belongs.
>
> The most worked mines are those of the Espinhaco chain; they are grouped along a straight meridian line running from the town of Barabacena, in the State of Minas, to Jacobina, in the State of Bahia, over an expanse of more than 1,200 kilometers (746 miles). The principal areas under active operation comprise Morro Velho (see St. John del Rey mines), which is very prosperous; Passagem (See Ouro Preto mines), which is meeting with success; São Bento, which possesses modern installations for cyanidation; São Luiz, which has a similar equipment; and Descoberto, which is a new field, the extracting of gold having commenced in 1903. The Morro Velho mine (see St. John del Rey mines) is one of the principal gold mines of Brazil, and from 1837 to 1886 it produced 58½ tons of refined gold.

A considerable amount of dredging work has been carried on in the past with varied success, a number of the dredging companies having been very much overcapitalized. It was estimated before the outbreak of the war that a capital of about $160,000 was sufficient for each dredge employed. Two grains of gold, it was estimated, should be saved to each cubic yard dredged, and the cost of operating a dredge of 3 to 5 foot capacity per bucket, working 120 hours per week, should not be much in excess of $1,200 per month. An extraction of 80 cubic yards per hour ought to produce a profit of nearly $20,000 per annum.

COPPER MINING.

Copper exists in numerous sections of Brazil, although the present production is very small. A number of sporadic attempts have been made to develop some of the ore bodies, without great success during recent years; nevertheless, the future of this branch of the mining industry holds considerable promise.

A mass of native copper weighing more than 2,600 pounds was discovered a number of years ago near the city of Bahia. The State of Bahia contains many known deposits of copper, and many of the deposits, it is said, might undoubtedly be developed successfully. Among the known copper districts of Bahia are the following: (1) Along the Verde River, not far from the boundary with Minas Geraes; (2) at Condeuba, in the southern part of the State; (3) at Maracas, in the south-central part of the State; (4) the Carahyba mines at Praba, Jaguary district, in the north; (5) at Patemute, in the north; (6) at Jacobina, in the central districts; also at Curaca, near Bahia, at Chapa del Velho in the west, and elsewhere.

The State of Rio Grande do Sul in the far south of the Republic also holds considerable promise. Well-organized attempts have been made in this State to mine and smelt the copper. An extensive property was opened up in this State a few years ago, this being located at Camaquam, about 2 miles from the river of that name and about 50 miles from Rio Negro, a station on the Brazil Great Southern Railway. This property, on the average, gave assays of about 6.5 per cent copper and 30 grams of gold per metric ton. At Cacapava, in this State, several properties of moderate size have been developed with unknown results. Other small mines variously located have also been worked in a small way.

The State of Minas Geraes, which has thus far proved the most important mining district in the Republic, will probably rank next to Rio Grande do Sul and Bahia as a future producer of copper. Deposits have been located at Lavras, where a certain amount of development has been carried on with varying success; also near Ouro Preto, one of the important towns of the State. Other outcroppings of the mineral have also been discovered, these being variously located.

Not far from Campos, an important city on the Leopoldina Railway, in the State of Rio de Janeiro, copper ore has been located in promising quantities. There is also a deposit near São João da Barra.

In Ceara, Goyaz, Matto Grosso, Parana, and Rio Grande do Norte, ore deposits, more or less promising, have been located. In Maranhão, within the municipality of Chapado, an ore body of some size has been located. In São Paulo several attempts have been made to develop copper deposits in the mountains, but presumably all of the mines, which were mostly small, have been abandoned, inasmuch as the copper was found to occur only in small pocketlike veins. In the far interior of the State there are traces of copper, but the quality of the ore deposits is unknown.

Many of the ore bodies already discovered are located at considerable distances from railways and rivers and are not readily accessible owing to the absence of roads and other means of conveyance. It is probable, however, as the development of this great Republic is carried forward, that copper mining will take a high place among the nation's industries and that the annual value of its production will be surpassed only by manganese, gold, and diamonds.

The Carahyba Copper Mine (Minas de Cobre de Carahyba), located at Praba, Jaguarary, State of Bahia, of which mention has previously been made, was originally opened in 1783. The mining property covers 6,000 hectares (14,826 acres) and is about 30 miles from a railroad. The mine has been worked at intervals, and a smelter was at one time constructed on the property. In 1903 a British concern carried on a certain amount of work at the mine but subsequently abandoned it. It is said that, although the area of this property is considerable, the depth of the ore bodies has never been accurately determined.

The Société des Mines de Cuivre du Camaquam was organized in Belgium during 1899 to work the mines at Camaquam, in the State of

Rio Grande do Sul. The capitalization of this company was 1,900,000 francs, in shares of 500 francs par, as well as 250,000 francs debentures. The equipment of this company included a mining plant of fair size and importance, with a hydroelectric installation. Water power, it was found, was sufficient to run the company's 80-ton mill the whole year round. A small smelter was erected. In the year 1907 the production of copper was about 2,000,000 pounds. It is said that operations were later suspended. The head office of this company was at Brussels, Belgium.

A French company known as the Société Anonyme des Mines de Cuivre du Seibal, organized in Paris in 1903, with a capitalization of 415,000 francs, also formerly operated at Camaquam. Its property, located not far from the Belgian property just described, carries gold, silver, and copper. Although a fair sum was spent in development work, the property is presumed to have been abandoned by the company and was, at last accounts, idle.

DIAMOND MINING.

The diamond-mining industry of Brazil dates from the year 1721, when the first stone was discovered by a gold miner named Bernardo da Fonseca Lobo. The Government took prompt steps to develop the industry, and within 10 years of the date of discovery between 35,000 and 40,000 men were at work in the diamond fields. The exportation of the precious stones during the 40-year period 1732–1771 totaled 1,666,569 carats valued at not less than $17,500,000.

Among the various diamond fields that of Diamantina is one of the most important and widely known. The city of Diamantina, located in the State of Minas, about 500 miles from Rio de Janeiro, has a population of about 15,000 and is the center of the district. Within the district are the headwaters of the rivers Arassuahy, Doce, and Jequitinhonha, and the area is filled with deep ravines with numerous small streams, which become swollen and even turbulent during the rainy seasons, working out potholes in their beds in which diamonds are most likely to be found. About 70 years ago one of these potholes was found to contain diamonds weighing a total of 10 pounds and about 28 pounds of gold. The gems are also found in the ranges in a sort of bluish clay deposit, in beds of various thicknesses, interstratified through a great mass of multicolored clays, stained by oxides and organic matter. The rocks in which these deposits exist consist of sandstone and schist.

Other diamond deposits in Minas Geraes are at Grão Mogul (Grand Mogul), about 100 miles north of Diamantina (discovered 1771); at São João de Chapida, 13 miles from Diamantina; at Boa Vista, Serrinha Bagagem (Estrella do Sul), etc. Bagagem is located 250 miles from Diamantina, near the boundary with the State of São Paulo. In the river bearing a similar name and near the place mentioned, there were discovered three famous diamonds—(1) the Estrella do Sul, found in 1853, which weighed 254.5 carats uncut and 125.5 carats cut; (2) the diamond of Dresden (year 1857), weighing 117.5 carats uncut and 76.5 carats cut; and (3) the Estrella de Minas, weighing 175 carats. The diamond that was given the name of Estrella do Sul was sold to the Gaekwar of Baroda for

£80,000, while the Dresden stone realized £40,000 and was purchased by the same Eastern ruler.

In addition to the various diamond fields of Minas Geraes, stones have been located in Parana, Bahia, Goyaz, Matto Grosso, and São Paulo. The Parana deposits are found in various rivers, including the Yapo and the Tipagy. The gems found in this State usually run small but are of excellent quality. The Bahia fields extend from Sincora on the south to Morro do Chepeu on the north and cover a considerable area. Several years ago a somewhat extensive discovery of the gems was made at Itapicuru, in Bahia, this new field holding considerable promise. In Goyaz the discoveries were of recent date and were principally in the Graca River, which is a tributary of the Araguaya. In 1906 a stone of 600 carats was located in the Verissimo River in the southern part of the State, but was partly destroyed by being tested on an anvil with a heavy hammer and split into small fragments. The Matto Grosso diamonds are found mostly in Coxipo Mirim River and are generally small, the largest found being about 5 carats. A number of dredges have from time to time worked this district with varying success. The São Paulo diamond field is a continuation of the Minas Geraes fluvial deposits, and the stones are found mostly in the rivers Sapucahy-Mirim and Verde. These deposits have not as yet assumed great importance.

Statistics concerning diamond production in Brazil are almost impossible to obtain. It is said, however, that more than 4 tons of the gems have been obtained during the two centuries since their original discovery in the Republic. Up to 1771, as stated, production totaled about $17,500,000. and from that year until 1850 approximately $35,000,000. Later figures are based wholly on estimates. There is a certain amount of mystery concerning production and exports, and it is commonly said that many so-called Cape diamonds on the European markets originated in Brazil.

IRON ORE.

Brazil probably contains the richest and largest undeveloped iron-ore deposits in the world. Iron exists, it is said, in every State in Brazil. The deposits existing in the State of Minas Geraes are so vast that they consist often of actual mountains, and cover, it is estimated, 247,000,000 cubic meters. The quantity of the ore thus far surveyed, existing in 52 outcroppings in Minas Geraes, is estimated by Government engineers to total as high as 12,000,000,000 tons of the highest grade.

Iron was discovered in Brazil in 1589 by a Paulist priest. In 1600 a foundry was established at Ipanema, State of São Paulo, this being, it is said, the first iron foundry to work in the Western Hemisphere. This establishment was closed down in 1620, reopened at various times, and enlarged in 1810, working from that year almost continuously until about 1895. Its production during that period averaged from 3 to 4 tons daily.

A number of the iron deposits have been acquired by American, British, French, and German interests. Among the interests controlling these properties are a number of iron-ore operators from Minnesota and Wisconsin, the St. John del Rey Mining Co. (see "Gold mining"), and the Itabira Iron Ore Co. (British). The St.

John del Rey Mining Co. owns 90,886 acres of property containing iron ore. Mr. Chalmers, the present manager of the company, stated in the stockholders' report for 1912 (on file at the Bureau of Foreign and Domestic Commerce, Washington) that one can travel for 23 miles in one direction and for 16 in another direction on outcrops of ore, canga, or rubble. In one deposit the surface ore in sight is 30,000,000 tons of 60 per cent pure ore; and it may safely be estimated that the tonnage would total 160,000,000. This deposit is one of a number on the property. The assays from 570 samples tested by Mr. Chalmers averaged 67.3 per cent iron and 0.053 per cent phosphorus. These ore deposits have thus far not been developed, but may be said to be of considerable importance.

The American interests controlling properties in Brazil have incorporated as the Brazilian Iron & Steel Co. Their ore deposits are located in the eastern part of the district near the headwaters of the Doce River.

The iron-ore district of Minas is northward from Rio de Janeiro and is reached by the Central of Brazil Railway and by the Leopoldina Railway. A line from the port of Victoria will also tap a portion of the field. The altitude of the iron district varies from 2,000 to 6,000 feet, and the climate is generally good. Owing to the uneven character of the country, railway traffic is at present limited. Wagon roads are almost unknown, and the only facilities for travel, aside from the railroads, are the few rough mule trails.

Concerning the iron ores of Minas Geraes, the following excerpt from an article by E. C. Harder, "The Iron Deposits of Brazil," which appeared in the South American for May, 1917, may be of interest:

> The iron ores of Minas Geraes are associated with a series of ancient-folded and metamorphosed sedimentary rocks. One of the beds composing this sedimentary series is an iron-bearing quartzite called itabirite, and in this are found the principal iron-ore deposits. The rock beds are complexly folded, so that in many places they stand on end, and the outcropping belts of the iron-bearing quartzite wind back and forth through the district over an area about 60 miles wide east and west and more than 100 miles long. Throughout this region iron-ore deposits of more or less importance occur along the belts of iron-bearing quartzite, the principal ores being found as lenses interlayered with the quartzite. Such lenses of ore range up to more than 2 miles in length and up to several thousand feet in thickness, although bodies of this size are exceptional. Some lenses consist of pure, hard hematite; others of soft, powdery hematite; and others of soft hematite with more or less intermixed sandy or clay material. The hard ores crop out prominently, in many instances forming the summits of mountains or ridges that are landmarks for miles around. The soft ores usually do not show on the surface.
>
> The disintegration and breaking up of the iron-bearing quartzite and ore by erosion results in the formation of a hard surface crust of ore of varying thickness over most of the ore-bearing areas. This is due in part to the removal of impurities by surface waters, leaving the iron oxide more concentrated, and in part to the mechanical accumulation of blocks and particles of iron ore on the lower slopes of ridges. Iron oxide cements the loose materials into compact blanket deposits known as "canga." The canga covers large areas and in places varies up to 50 feet in thickness. Only low brush grows on it because of its hardness, and thus iron-bearing areas throughout the district are commonly barren of trees and but sparsely covered with other vegetation.

Thus far the development in the iron fields has been extremely slow. High costs of coal and other fuel that might fill requirements have prevented the operation of smelters of sufficient size to warrant the investment of capital in them. As will be indicated in a later paragraph, coal exists in Brazil, but thus far its quality is hardly good enough or its supply sufficient to be of use in the iron industry. Oil fields are being prospected, and there is a possibility that sufficient petroleum may in time be obtained to run the smelters. There is a likelihood that electric smelting may come into use. Some experiments have proved that this is practicable. It seems probable, however, that most of the ore will, for a time, have to be sent to foreign markets for smelting. Lack of fuel supply and a scarcity of ships for transportation purposes, coupled with insufficient railway facilities, are thus the cause of the slow development in the iron industry. The war and the consequent high prices obtainable for the ore may, however, bring about a great expansion in the industry at an early date. Estimates of the quantity of ore existing in Minas vary from 2,500,000,000 tons to 12,000,000,000 tons, the latter estimate, as stated, being by Government engineers.

There is a large quantity of iron in the State of Parana. A deposit has been located at Bom Retiro do Mundo Novo (Antonina), about 3 miles from the Atlantic, a near-by port being accessible to vessels of about 300 tons. About 6,000,000 tons of ore have here been located. A large deposit also exists in the interior of Bahia, and one of the extensions of the Bahia Railway system was surveyed with the idea of developing this iron-ore body, which is extremely large and rich. In the various States of southern Brazil, including Rio Grande do Sul and Santa Catharina, considerable ore bodies have been located, and these hold promise of successful development following the investment of capital. Some of these iron bodies have been mined and smelted, but only in the most primitive way, by means of a few small charcoal furnaces.

COAL MINING.

The presence of coal has long been known in Brazil and the product has long been mined in a somewhat primitive way. Recently, however, the rising cost and the difficulty of obtaining the mineral from Europe and the United States have caused renewed interest in the development of the local mines. The principal coal deposits exist at Tuberão, in the State of Santa Catharina, and at Xarquedeas (São Jeronymo Railway & Mining Co.), Candiota, Rio Negro, and Jaguarão in the State of Rio Grande do Sul. Deposits of considerable size and probable importance have also been located at Quixambinha, in Pernambuco, in the State of Parana, and elsewhere. Lignite occurs in Minas Geraes, and peat has been found in various States.

American interests have recently made extensive purchases of coal lands in the State of Parana and are expected to develop the properties extensively.

The veins of coal at Tuberão attain a thickness of about 10 feet, while those at Xarquedas reach a thickness of about 13 feet. The Candiota seams vary in thickness from 4 to 10 feet. The São Jeronymo Co.'s property at Xarquedas has been in active operation for some years and produces upward of 20,000 tons of coal per annum.

According to a report by Vice Consul Richard P. Momsen, dated March 12, 1918, in Rio Grande do Sul the greatest activity is seen at the São Jeronymo mines. At present two shafts are open and in operation, of which the oldest (Fraternidade) produces from 300 to 350 tons daily, while the newer mine (Concordia) with a constantly increasing tonnage was yielding 270 tons daily in January. The average daily production of the two mines in March, 1918, was about 650 tons per day. A third shaft was then being sunk, which should increase the daily production to between 1,000 and 1,200 tons. Being high in volatile matter, this coal produces good gas and salable coke for the city of Pelotas. Orders have been placed for compressed-air drills to increase the production.

At Jacuhy the mine reached a depth of 60 meters in January, 1918, and it was expected that by July the production would reach between 6,000 and 12,000 tons per month, to be increased still further by the end of the year. The company expects to be able to offer its coal at sufficiently low prices to compete with foreign coal after the war.

In the Jaguarão River valley near Rio Negro, Candiota, and Santa Rosa coal operations are being initiated. This coal is sold at from 15 to 20 milreis (about $3.75 to $5) per ton at the place of extraction, while that of the São Jeronymo mines is bringing 60 milreis (about $15) per ton after having been transported from the mines to Pelotas and the port of Rio Grande. The latter is a deep-mined coal, while the former is said to be a surface coal and of poorer quality.

In the valley of the Jacuhy River there is abundant evidence of outcroppings which promise further discoveries of new deposits.

The principal coal fields in the State of Santa Catharina, Vice Consul Momsen says, are in the valleys of the Tuberão, Mao-Luzia, Ronco d'Agua, and Urussanga Rivers. The firm of Lage Irmãos, in the Tuberão District, is rapidly developing its properties, but is handicapped in railroad construction by lack of rails. The daily production varies from 60 to 70 tons and is chiefly transported by oxen. With sufficient railroad facilities the production of these mines should be from 300 to 400 tons per day. At Barra Branco, Ponte Alto, and Crissiuma operations are steadily progressing, but the chief obstacle is lack of transportation facilities. At the latter mine special care is taken to free the coal from impurities under the direction of the eminent engineer, David Draper, whose name is associated with the African diamond discoveries. In other parts of the State surveys of coal deposits are being made; and if the war and the present freight stringencies continue, making British and American coal not only expensive but practically unobtainable, the Brazilian coal industry will have received sufficient impulse to have created another permanent domestic source of wealth, and it will, partly at least, have a tendency to alleviate the fuel shortage, which has to a great extent impeded the progress and expansion of the manufacturing industries of the country. The principal difficulty in extending the use of Brazilian coal is inadequate water transportation and the high cost of hauling by either overland or water routes.

Vice Consul Momsen is informed that the Viação Ferrea Rio Grande do Sul Railway is burning Brazilian coal in its locomotives—mixed with wood. It appears that this company has just made a contract for 24,000 tons of native coal for the current year.

Brazilian engineers have always been hopeful that discoveries of iron deposits sufficiently near the coal-bearing areas to permit the establishment of an iron and steel industry in the country might be made. Thus far investigations have not revealed any discoveries of sufficient importance to indicate the possibility of coordinating these two mining operations. The rich deposits of iron ore found in unlimited quantities in the State of Minas Geraes are, at least under present transportation conditions, too far from the sources of coal to make possible a practical utilization of these minerals in an extensive iron and steel industry in Brazil.

The Government is fully alive to the coal situation in Brazil and is lending its aid to the development of the mineral beds. Recently the President authorized the construction of a railway to develop important coal fields and authorized the Government to raise approximately $7,500,000 of 5 per cent bonds with which to aid coal companies by subscribing to their capital obligations. It was also agreed to exempt such companies from customs duties, grant reduced rates on State railways, etc. It is claimed that the results of analysis of briquettes made from Santa Catharina coal indicate that the caloric value is little less than that of Welsh patent fuel. A large amount of this fuel is used by the Lloyd Brasileiro and other steamship lines (including the Japanese Line), by railways, mills, etc. A small amount is annually exported to Argentina and Uruguay.

PLATINUM.

Platinum has been discovered in several localities in the Republic, including the States of Pernambuco, Parahyba do Norte, and Minas Geraes, existing in gold-bearing quartz among crystalline schists, in the alluvium of rivers, and elsewhere.

NICKEL.

Nickel has been located in Santa Catharina, Rio Grande do Sul, and Minas Geraes (at Ayurvuca). Thus far little or no development has been carried on, but it is claimed that the ore beds are of sufficient size and importance to warrant an exhaustive investigation. The deposit in Rio Grande do Sul is located near São Luiz.

SALT.

Salt exists in the State of Rio Grande do Norte, in Macao and Mossoro. This salt is shipped to various sections of the Republic. There is a small salt works at Cabo Frio, in the State of Rio de Janeiro, the products of which are used locally. Salt pans also exist in the State of Minas, and, it is stated, the industry is capable of considerable development. The production of the various salt deposits is only a fraction of what might be obtained, and the Republic is at present a large importer of the product.

MONAZITIC SANDS.

Brazil contains probably a larger quantity of monazitic sands than all the rest of the world. Formerly Austria, and later Germany, were large purchasers of sand, the latter in 1910 importing 15,665 tons, valued at approximately $1,000,000. The deposits extend along the coast northward from Rio de Janeiro and are also found on the banks of various rivers, in the States of Bahia, Rio de Janeiro, Minas Geraes, and Espirito Santo. The product is used largely in the manufacture of gas mantles (incandescent) and has considerable value. The thorium that the sands contain and that is used in the gas-mantle industry is extracted before exportation, several factories existing in the Republic for this purpose. The percentage of the thorium in the sands is about 1 to 50. Some deposits of this sand have been found from which as high an average as 5.72 per cent of the thorium has been obtained. In the event that other uses than the manufacture of gas mantles should be found for the monazitic sands, the product would doubtless greatly increase in value.

GRAPHITE.

Graphite occurs in several Brazilian States, principally, however, in Minas Geraes and Bahia. A number of deposits have been located, many of which are at present inaccessible, owing to lack of transportation facilities. A deposit existing at São Fidelis, State of Rio de Janeiro, is being worked extensively and the product used by a pencil factory located at Rio de Janeiro. One or two other deposits are also being worked in a small way, the product being used wholly in local markets. The industry will probably expand considerably in the future, following the improvement in transportation facilities.

OTHER MINERALS AND PRECIOUS STONES.

In addition to the various minerals heretofore described, the vast Republic of Brazil is a storehouse of numerous other varieties of minerals and precious stones. Among these may be briefly mentioned the following:

Asbestos.—Exists in the Serra da Estrella, in the State of Rio de Janeiro, in the State of Bahia, and elsewhere in the Republic.

Antimony and tin.—Small quantities of these minerals have been discovered in the Republic, stream tin existing in a concentrated form in the Paraopeba River, State of Minas Geraes.

Bismuth.—Exists in the State of Rio Grande do Sul.

Barium.—Found in various localities in the State of Minas Geraes.

Cinnabar.—Has been discovered in various sections of the State of Minas Geraes, although not in large quantities.

Emery.—This has been found in various places in the State of São Paulo, the largest and most important deposit being located at Matta do Paiol, a station on the Sorocabana Railway, about 35 miles from the city of São Paulo.

Kaolin.—A number of large deposits of kaolin have been located, principally in the States of Rio Grande do Sul, Rio de Janeiro, Bahia, and Minas Geraes. A quantity of the product shipped from Rio Grande do Sul to Limoges, in France, was pronounced equal to the best obtained from Japan, and there are prospects that this deposit will be extensively developed and porcelain ware manufactured in Brazil. At last accounts this property was held by French interests. At Vassouras, a station in the State of Rio de Janeiro, a quantity of kaolin exists, one mass alone containing 200,000 tons.

Marble.—Exists in the States of Rio de Janeiro, Minas Geraes, São Paulo, Parana, and elsewhere; is quarried extensively in Minas, the colors being white, rose, and onyx. Green, rose, and pure white are the prevailing colors in Parana.

Mica.—Goyaz, Minas, Bahia, São Paulo, and Rio de Janeiro each contain deposits of mica—some extensive. A small quantity is usually exported, mostly from Santa Lucia de Carangola, State of Minas. That found in the State of Goyaz is considered of the best quailty.

Molybdenite.—Variously located; principally in Parana.

Saltpeter.—Found in small quantities in Minas Geraes and São Paulo. The Brazilian deposits are not likely to attain commercial importance.

Silver and silver-lead.—In the State of São Paulo lead has been located and its quality tested. About 500 grams of silver were obtained from 100 kilos of lead in certain samples. Experiments on the average quartz showed 50.4 per cent lead and 0.595 per cent silver. These experiments were made at Apiahy. Other deposits exist at Iporanga, in the same State, and elsewhere in the Republic. Silver ore has been discovered in the mountains of the State of Parana.

Soapstone and talc.—These exist in the State of Minas and elsewhere and have been exploited for local use to a considerable extent.

Wolfram.—Found in fair quantities in Rio Grande do Sul (at Encrusilhada). The proportion of tungstic acid obtained in the quartz is said to be about 40 per cent.

Among the precious and semiprecious stones, other than diamonds, found in various parts of Brazil there may be mentioned garnets, opals, pearls, rock crystals, rubies, sapphires, topazes, and tourmalines. One or two emeralds have been discovered, but there are no evidences of any quantities existing. The garnets that have been obtained are usually small in size, rarely exceeding a few carats in weight Opals are also generally small and are of no great value; they are found in Minas Geraes. Many fine pearls have been discovered in the numerous rivers of the Republic, but no systematic attempt has been made to obtain them. The largest number thus far obtained have been found in the Araguaya River, in Goyaz; these are mostly small fresh-water pearls of various colors. Rock crystal, which can hardly be classed as a "precious stone," is quite common in Brazil, and before the war was exported in fair quantities, mostly to Germany. Its local pre-war market value was about 50 cents a pound. Rubies are exceedingly rare, and probably not more than a dozen gems of good quality have thus far been obtained. Ruby corundum of a massive form is found in São Paulo.

The topaz industry was once of some importance in Brazil, but has been continuously on the decline for the past quarter of a century and is now of little importance. At Rodrigo Silva, near Ouro Preto, a mine was worked during recent years, and in 1912 about 200 kilos of stones were obtained, scarcely any of which were flawless. The depth of the shaft at this time is about 100 feet. Numerous additional finds of the gems have been made in various localities, including the Ilha Grande, near Rio de Janeiro, at Olinda in Pernambuco, in Rio Grande do Sul, in the Tibagy River, State of Parana, and elsewhere.

Tourmalines exist in the northeastern part of the State of Minas and have been systematically mined and exported during the past 15 years. Most of the trade in these stones has in the past been handled by Germans. The stones are frequently found in cascalho in the forest regions, generally at a depth of 2 to 3 feet below the surface. They are valuable and prior to the war enjoyed a fair market in

Europe. Large clear gems were quoted a few years ago at $500 a kilo and small stones as high as $200 a kilo.

Sapphires are found in fair quantities but, as a rule, are not of superior quality.

In addition to the gems and valuable stones and crystals heretofore mentioned, there are numerous other varieties, more or less valuable, existing within the Republic.

There is no question that Brazil is a treasure house of developed and undeveloped (mostly the latter) mineral wealth. As has been shown, the State of Minas Geraes has taken the lead in the mining industry and contains within its boundaries almost every known variety of ores and gems. There are said to be good openings for well-organized and honestly and efficiently managed mining companies provided with sufficient working capital and having an understanding of local conditions. A very large proportion of the river gravels in the mineral zones have been either only partly explored or totally unexplored and are believed to contain enough gold to warrant the hope of substantial returns from dredging enterprises. The laws of the Repubic governing mines and mining are just and equitable, and the Government is willing to lend its aid and give encouragement to the industry.

PETROLEUM DEPOSITS.

Petroleum is known to exist in the Republic of Brazil, but whether or not in commercial quantities is a problem remaining to be solved. Discoveries of oil have been made in several States, including São Paulo (at Ibitinga and Taubate), Bahia, Minas, and Alagoas, and traces have been found elsewhere. It is also generally believed that the deposits existing in the southeastern section of Colombia extend into northwestern Brazil—a region, however, somewhat remote from routes of traffic.

Explorations in the State of Bahia have brought to light a number of petroliferous springs, yielding small quantities of an excellent grade of oil, but thus far no active development has taken place.

Concerning oil in Brazil, Mr. Ralph Arnold, in a paper entitled "Conservation of the Oil and Gas Resources of the Americas," in Economic Geology (1916), says:

> The oil shales are of Eocene age and extend intermittently from Porto Alegre (on the south) along the coast for over 1,200 miles, nearly to the mouth of the Amazon. Portions of the shales suitable for distillation have been reported at the following, among other, localities: North of Ilheos, on the Itahipe River; on the island of João Thanis, in the Marahu River, 80 miles south of Bahia; on Tinhara Island, 30 miles south of Bahia; at Riachadoce and Cama Rajibe, 25 and 45 miles, respectively, north of Maceio; in the Province of Alagoas; and in the Sierra de Araripe, in the State of Ceara.

Various geologists have given their opinions concerning the extent of the possible oil wealth of Brazil. These opinions have differed widely. As stated, little is known concerning the possible future of the industry, although much is hoped for.

AGRICULTURE.

COFFEE.

Coffee is by far the most important crop and the chief source of wealth of southern Brazil. It is grown over vast areas of the States of São Paulo, Rio de Janeiro, Minas Geraes, and Espirito Santo.

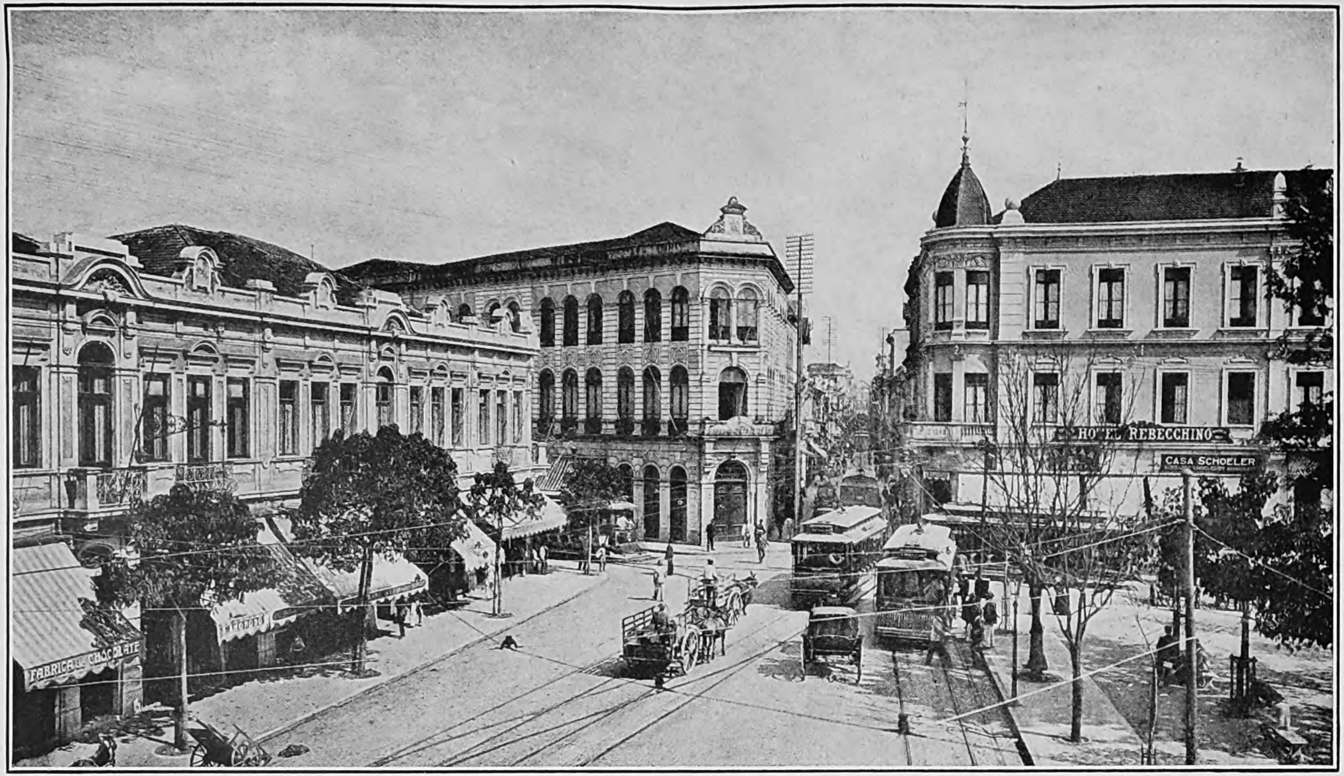

FIG. 12.—STREET SCENE IN SÃO PAULO, BRAZIL.

There are, it was recently stated, 1,400,000,000 coffee trees in the Republic, of which 750,000,000 are in the State of São Paulo. The total number of farms in São Paulo planted with coffee trees is estimated at 60,500. Probably more than $1,500,000,000 is invested in coffee plantations in Brazil, São Paulo's share of this total approaching $900,000,000. From two-thirds to three-quarters or more of the coffee consumed in the entire world is produced in Brazil, the São Paulo Railway carrying through São Paulo to Santos for shipment in 1915 no less than 13,444,756 sacks of 60 kilos (132 pounds) each, this representing almost the entire exported production of São Paulo and large quantities from neighboring States. The Brazilian crop for 1916–17 was estimated at 13,500,000 bags (15,742,000 in 1915–16) and that of the rest of the world at 4,500,000 bags. The coffee exports of Santos for 1915 were valued at $113,424,679, and the average value for the 10 years 1906–1915 was $120,000,000. There was a slight increase in 1916 in the total value of coffee exported, the United States purchasing $65,176,310 (692,736,924 pounds) of the Santos crop for 1916 and a total of $73,541,315 worth from the entire Republic.

Coffee does not grow well in the northerly States of Brazil, and the approximate southern limit for its growth is the State of Santa Catharina.

A recent estimate of the cost of coffee production, etc., in the State of São Paulo shows the following: Clearing forest land, per acre, $3.33; planting per 100 trees, in line, $2.50; care of each 100 trees during four-year period, $13; annual maintenance expenses per 100 trees, $2 to $2,25; cost of gathering each bushel of coffee, $0.12; drying per bushel, $0.03; transportation per bushel (in large quantities) $0.025. There are usually slight additional overhead costs. The above figures are, of course, subject to variations.

There are numerous estates in the coffee district employing large amounts of machinery and representing considerable investments. A good many joint stock companies are engaged in the industry, some of these being foreign. Among the foreign corporations may be mentioned the Dumont Coffee Co. (Ltd.), a British concern registered in 1896. This company, whose properties are located in the State of São Paulo, has an authorized capitalization of £800,000, in shares of £10 each, one-half being 1½ per cent cumulative preference shares and one-half ordinary shares. There are also outstanding £342,100 of an authorized £400,000 5½ per cent debentures, principal repayable in 1920, interest payable January and July, and subject to sinking-fund drawings up to 115. In 1910 a 25 per cent dividend was declared on the preference shares, liquidating all arrears, and full preference dividends have since been paid. In 1911, 20 per cent was paid on the ordinary shares; in 1912, 15 per cent; in 1913, 3 per cent; none since. The company has a reserve fund of £130,000. Figures for 1917 follow: Net profits, £40,452; brought forward, £48,919; total, £89,371; interest, £21,021; preference shares dividend, £30,000; carried forward, £38,350.

In January, 1918, the ordinary shares were quoted at 6⅝ (high since 1911, 16¼), preference shares at 9½ (high since 1911, 12½), and debentures at 94 (high since 1911, 108).

The São Paulo Coffee Estates (Ltd.) is another British public company in the field. Its capitalization consists of £120,000 preference shares of £5 par and £150,000 deferred shares of £10 par. There are also two small debenture issues, one of 5½ per cent interest, of which approximately £39,000 remained outstanding in 1916 (original issue £160,000), and £18,100 5½ per cent Santa Ernestina debentures. The preference shares receive dividends of 7 per cent per annum cumulative, in addition to which they are entitled to share with the deferred shares to the extent of one-half the profits remaining after 7 per cent has been paid on the deferred shares. During recent years the following dividends have been paid: 1905, 6 per cent on preference; 1906, 8 per cent (including 1 per cent back dividend); 1907. none; 1908 and 1909, 7 per cent annually on preference; 1910, 24½ per cent on preference; 1911, 14 per cent, completing payments of all overdue dividends; 1912, 18⅝ per cent on preference and 16 per cent on deferred shares; 1913, 7 per cent on preference; 1914, none; 1915 to 1917, 7 per cent on preference. The preference shares (£5 par) were quoted at 4½ in January, 1918, as compared with 7⅞, the high since 1911.

The Agua Santa Coffee Co., a British corporation, registered 1913, owns an estate in the Mattao district of the State of São Paulo, covering an area of 3,540 acres, of which 2,200 acres had been planted with 630,000 coffee trees when acquired. The authorized capitalization is £150,500, all issued, consisting of £75,000 7 per cent cumulative preference shares, which are entitled also to 25 per cent of the profits after 7 per cent has been paid on the ordinary shares; £75,000 ordinary shares, both issues of £1 par; also £500 in deferred shares of 1s. each. This last-mentioned class of stock is entitled to 25 per cent of the remaining profits after 7 per cent has been paid on the preference and the ordinary shares. Dividends have been paid by the company as follows: 1913, 7 per cent on the preference and 3 per cent on the ordinary; 1914, 3½ per cent on the preference; 1915, 10½ per cent on the preference and 2½ per cent on the ordinary: 1916 and 1917, 7 per cent each on the preference, also 2.58 per cent and 2½ per cent on the ordinary. The £1 ordinary shares were quoted in January, 1918, at 9s. 6d., the preference shares at 17s. 3d., and the deferred at 1s. 6d.

CACAO.

Brazil, in the year 1915, stood second among the nations of the world as a producer of cacao. The crop produced during that year was 46,260 tons, or 15.9 of the world's total production (Gold Coast, Africa, 77,278 tons, or 44.4 per cent). Of this total, 41,546 tons were exported from Bahia, which is the principal producing State in the Republic. The 1916 crop exported from Bahia was 37,481 tons. The 1917 crop was estimated to equal that of 1915.

There are stated to be very large areas in Brazil still available for the growing of cacao. The various States of the Republic stretching from the Amazon southward to northern São Paulo and Matto Grosso grow more or less cacao, that raised in Maranhão being regarded as the finest. It is claimed that the industry offers good opportunity for the profitable investment of moderate amounts of capital and will probably continue to do so for some time. Plantations yield anywhere from 5 to 13 pounds per tree, cases having been known where 20 pounds per tree were secured. It is claimed that one person may take care of as many as 1,000 trees. The export and other duties and taxes are moderate. A prewar estimate stated that each plantation would cost $0.80 to $0.85 per tree and that in Bahia there were from 8,000,000 to 10,000,000 trees. Trees are generally planted about 300 to the acre and are usually grown on land 4 or 5 miles from the sea or farther, plantations extending inland into the mountain ranges. A somewhat humid climate is best suited for their growth.

BEANS.

Beans are grown in large quantities in Brazil, but until recently were almost wholly consumed at home. During the past year or two the country has exported them. The crop for 1916 in Rio Grande do Sul was valued at more than $4,000,000 and in other States considerably exceeded that figure. The crop in São Paulo for 1916 was about 2,600,000 sacks of 132 pounds.

RUBBER.

The rubber industry of Brazil, despite all that has happened during the past three or four years, ranks second in importance to the raising and exporting of coffee. The exports of this product during 1916, 31,495 tons, were valued at $36,537,475, as compared with $33,946,432 in 1915, $33,521,504 in 1914, and approximately $80,000,000 in 1912.

Much has been written during recent years concerning this subject, and the phenomenal rise in the price of the products to dizzy heights, to be followed shortly by an equally spectacular crash, is now a matter of history. As is generally known, very little plantation rubber has been grown in Brazil, and owing to the more or less wasteful methods employed in tapping the trees of the Amazon basin, the high cost of supplies and materials, and the scarcity of labor, the Brazilian rubber merchant has found it difficult to compete successfully with the plantations of the East.

It has been pointed out that the high export duties tend to check the recovery of this industry. While this is partly true, it should be borne in mind that these export duties form the principal sources of revenue for the State of Para and adjacent territories, and unless some other means of raising revenue can be found it will be almost impossible to reduce them materially.

Every endeavor is being made to encourage the establishment of rubber plantations in the Republic, and the Government is lending aid to the industry and studying up-to-date methods. In the Amazon district, where the best quality of rubber is found, there is no great amount of cleared land and most of the district is more or less subject to floods. The half-civilized Indians of the territory, although able and willing to gather wild rubber, are not inclined to work on plantations and do not make good laborers. Therefore the problem of obtaining sufficient hands to take care of the rubber trees is not an easy one to solve. There are, however, a few plantations on the coastal lands, and progress is being noted. The quality of the Para rubber is too well known to require more than passing comment, and the industry seems almost certain to come into its own again.

The wasteful methods which, as stated, have been employed by many of the rubber gatherers in obtaining the wild rubber have made it necessary for these men to seek sources of supply each year at points higher up the river and its tributaries and have thus added greatly to the cost of production. Nevertheless, there are still vast untapped areas and, thanks to a partial rally in the market price of the commodity, there are signs of some improvement.

The men employed in gathering rubber in the forests have frequently numbered 15,000 to 20,000. It was estimated during the days of good prices that these laborers, if successful, would frequently clear from $500 to $600 per year, and in some cases as much as $1,000.

TOBACCO.

The State of Bahia is the principal center of the tobacco-raising industry, although the product grows freely in almost every State in the Republic. Despite the large amount grown for home consumption, exports for 1916 reached the respectable total of $7,277,378 (21,293 tons), of which $167,399 went to the United States, this total comparing with $5,656,305 in 1915 and $6,957,542 in 1914. Formerly Germany took most of the Brazilian tobacco.

It is said that the tobacco industry of Brazil had its origin before the coming of the white man and that for centuries it has been raised in large quantities. It has been estimated that a plantation of 150,000 square meters requires an annual outlay of £1,580 and earns approximately £2,120 each year.

COCONUTS AND COPRA—OIL NUTS—VEGETABLE IVORY.

The coconut is found in practically all parts of Brazil, but is not a product of great commercial importance in the southern sections of the country. There are vast areas in the Republic well adapted for its growth, and the industry should expand greatly in the future. A report submitted August 5, 1917, by United States Consul A. T. Haeberle, who is stationed at Pernambuco, contains data gathered by Mr. A. J. Brooks, an American engineer, who made a trip to Brazil to study the industry and who traveled extensively through districts suitable for the growth of the nuts. The report follows:

> The coconut zone of Brazil fringes the coast from Parahyba on the north to Bahia on the south. This zone is spotted with coconut groves varying in size from a few hundred trees to 40,000. The total number of bearing trees approximates 1,250,000. The annual yield per tree is 40, or a total annual production of 50,000,000 nuts. The average size of the nuts compares well with the products of other tropical countries, 5,000 nuts being required per ton of copra.
>
> There are three ports from which to ship coconuts—Cabedello, Recife (Pernambuco), and Maceió. About three-fourths of the coconut trees are concentrated around Cabedello and Maceió.
>
> The price paid on the plantation for nuts varies with their size and their distance from the cities. The largest nuts command $35 per thousand, while the smaller ones are sold for $25 per thousand. The average selling price on the city market is $42.50 per thousand.
>
> No attempt beyond the experimental stage has been made to produce copra. The reason for this is the result of local conditions, namely, the limited number of available coconuts and the native's fondness for the nut as a table delicacy. With copra selling in New York at $160 a ton and freight averaging $10 a ton, the plantation owner profits 1 cent more on every coconut he sells on the local market than if he had turned that coconut into copra. This statement does not mean that copra can not be produced here at a profit. On the contrary, there is excellent opportunity for capital to operate a coconut grove and sell copra at a large margin of profit if a working organization were effected, if the other products of the tree were utilized, and if the available space were cultivated with catch crops.
>
> The possibilities of the coconut industry in Brazil are tremendous. The annual yield of the trees at present is 40 nuts per tree, despite the fact that

many of the trees are robbed of their fruit before the meat begins to form, to be sold upon the local market for their milk. This practice has appreciably lowered the vitality of the trees. Seed selection has been almost entirely neglected, and fertilization is a science never practiced.

Improper spacing is another existing evil that contributes to the retarding forces so prevalent in the Brazilian coconut groves. This is strikingly depicted in the case of two adjoining groves of the same age—one planted with 75 trees to the acre and the other with 130 trees. The annual yield of the former is four times that of the latter. Disease and pests are almost unknown. Labor is cheap.

The possibilities of disposing of the by-products are excellent. The fiber would find a waiting market in the form of cord or rope because of the absence of a cord factory here; the husk would sell readily for fuel; the milk is always sought by the native for his familiar breakfast food, the "cuscoos"; and the palm leaves are eagerly bought by the natives for building purposes.

An estimate of the cost of developing 2,000 acres of coconut land in Brazil would read about as follows: Based on an average of 75 trees per acre, the total number of trees on the plantation would be 150,000; average yield of nuts per tree, 75; total annual yield of nuts, 11,250,000; copra capacity in tons per month, 175. The expenditures until the plantation reached full bearing would approximate:

First year.—Rent, $500; seed ($28 per 1,000 nuts), $4,200; buildings, $500; tools, $2,000; clearing, planting, etc. (80 men at 25 cents a day), $7,000; salaries, $5,000; contingencies, $2,000; total, $21,200.

Second, third, fourth, and fifth years.—General maintenance, including rent, salaries, and catch-crop cultivation, $8,300 per year, or $33,200 in all.

Sixth year (first yield).—Plant for copra manufacture, $6,000; picking and collecting, $15,000; husking, $15,000; cost of making copra, $30,000; freight, Pernambuco to New York (50 per cent in excess of normal), $13,500; general maintenance, $8,300; contingencies, $4,000; total, $91,800.

Seventh year (first full yield).—Picking and collecting, $20,000; husking, $20,000; cost of making copra, $60,000; freight, Pernambuco to New York, $27,000; general maintenance, $10,000; contingencies, $4,000; total, $141,000.

The credit side of the account would show the following entries:

First year.—Returns from catch crops, average $2 per acre, $4,000.

Second, third, fourth, and fifth years.—Returns from catch crops, average $5 per acre, $10,000 a year, or a total of $40,000.

Sixth year (first yield).—Based on an average yield of 40 nuts per tree, the total would be 6,000,000 nuts, which would produce 1,000 tons of copra and 500 tons of coconut fiber or coir, and would be worth: Copra, 1,000 tons at $125 a ton, $125,000; fiber, 500 tons at $40 a ton, $20,000; catch crops, $10,000; Government aid, $10,000; total, $165,000.

Seventh year (first full yield).—Copra, 2,000 tons at $125 a ton, $250,000; fiber, 1,000 tons at $40 a ton, $40,000; Government aid, $10,000; total, $300,000.

At the end of the seventh year the plantation account would stand thus:

Year.	Expenditures.	Revenues.	Excess expenditure.	Excess revenues.
First	$21,200	$4,000	$17,200	
Second	8,300	10,000		$1,700
Third	8,300	10,000		1,700
Fourth	8,300	10,000		1,700
Fifth	8,300	10,000		1,700
Sixth (first yield)	91,800	165,000		73,200
Seventh (first full yield)	141,000	300,000		159,000
Total	287,200	509,000	17,200	239,000

This gives a net return for seven years of $221,800, or an average of $31,685 a year. On a capital of $30,000 this would mean an average annual return of 105 per cent.

The $10,000 yearly Government revenue referred to above is expected State aid to be paid under a bounty provision set forth in the South American Year Book for 1915, page 243, which reads:

> *Cultivation of coconut palm* (*bounties*).—The Brazilian Ministry of Agriculture has entered into a contract with Messrs. Octaviano Machado and Andre Christophe with a view to encouraging the systematic cultivation of coconut palms and the exportation of copra. Certain bounties are to be granted to the above-mentioned firm upon the following conditions: A report is to be presented to the Ministry before the end of the year giving full details as to the actual area under palm cultivation, the variety of palm planted, and the methods of cultivation adopted. A copra plant is to be established within two years to deal with the product of at least 3,000 hectares (7,400 acres) of coconut plantations. The Ministry of Agriculture will endeavor to obtain duty-free admission of all machinery necessary for the undertaking, and also the granting of a premium, for five years, of 30 reis per kilo (about one-half cent per pound) of copra exported, and 60 reis per kilo (about 1 cent per pound) of coconut oil exported, up to a maximum amount of $10,000 per annum. Similar terms may be extended to any other applicant at the discretion of the Government.

The Brazil nut is a product of considerable commercial importance. Exports for 1916 amounted to $1,722,114, as compared with $980,009 in 1915 and $2,280,275 in 1914. The trees from which the nuts are gathered often attain a height of 150 feet and a considerable girth. Most of these nuts come from the State of Para and are shipped from the port of Para (Belem).

Babassu nuts are exported from Brazil to the amount of several thousand tons annually, and the quantity should be considerably increased after the war. Most of these are exported from Bahia. These nuts yield a high percentage of oil not unlike that produced from the coconut. Another somewhat similar nut is one variously known as the souari, pekea, or butter nut, which is found also in the Guianas and Peru. The nut brings a good price and has excellent commercial possibilities, partly because of its edible qualities and partly on account of the fat that it contains, there being said to be a larger proportion in this nut than in any other known species. Experiments are being made as to the possibilities of cultivating this product, and it is believed that plantations of the trees would prove more profitable than an investment in coconuts requiring equal capital.

Vegetable ivory is also obtained in Brazil and exported in fair quantities. These nuts are produced by the piassava palm and are used for the making of buttons, beads, etc.

CARNAUBA WAX.

Carnauba wax, which is not unlike beeswax, is found in nearly all of the northern States and is of considerable commercial value. In addition to the wax, which forms an undercoating for the leaves of the tree, the roots and other parts are used for various purposes. During 1916 the exports of this product amounted to 4,167 tons, valued at $1,914,454, as compared with 5,897 tons, valued at $2,399,033, in 1915. In addition, large amounts of the products of this tree are used in the local markets, and the industry has generally assumed considerable importance. There are more than 1,000,000 of these trees in the State of Ceara, where they thrive well, and almost equal numbers in other States.

SUGAR.

The sugar plantations of Brazil are attaining considerable importance, a vast increase being shown in the value of the amount annually exported. There are a good many sugar mills in the Republic, although only a few use up-to-date machinery. During three recent years the exports of sugar have been as follows: 1914, 31,860 tons, $1,695,916; 1915, 59,074 tons, $3,607,452; 1916, 53,825 tons, $6,136,542. The exports of sugar in 1909 amounted to 70,208 tons.

Uruguay, Argentina, Great Britain, the United States, and Portugal are the principal customers for the sugar. The total output of sugar for 1916, including that consumed locally, has been estimated at 300,000 tons. Of the sugar exported in 1916, $3,449,405 worth was cleared from Pernambuco and Maceio. The exports through Bahia totaled 15,880 tons, valued at approximately $1,800,000.

The principal seats of sugar cultivation are the coastal lands and the interior districts, extending from the district adjacent to the port of Natal as far south as São Paulo. Although not so successful in the southern States of Brazil, sugar cane is raised as far down the coast as Rio Grande do Sul, in which State the 1916 crop was estimated to be worth about $3,000,000.

There is much criticism concerning the fact that the planters are so often taking advantage of the fertility of the soil and working crop after crop without fertilizing or taking proper precautions to prevent its becoming poor in quality. Such conditions are, however, not wholly limited to Brazil, as a tour of sugar-producing countries will indicate. It is claimed that Brazil is better adapted for sugar raising than any other country in the world and that the industry is destined to expand considerably in the future.

The yield of sugar per acre in the States of Rio de Janeiro and São Paulo averages, it is stated, 20 tons and upwards, the proportion of sugar in the cane averaging slightly more than that attained in Cuba. The results obtained are excellent but could be improved if more modern machinery were available. In the northerly States the cane ripens generally in about 15 months, and south of Rio de Janeiro in about 18 to 20 months. Although sugar is exported in considerable quantities, the high price in the local market indicates that there is no overproduction. It is frequently stated in Brazil that foreign capital could scarcely be more profitably invested than in sugar plantations equipped with modern mills and machinery and properly managed.

OTHER CROPS.

Space will not permit an exhaustive discussion concerning opportunities in other branches of agriculture, fruit growing, etc. Among the other crops of the Republic, cotton would rank first in importance. During the blockade days of the American Civil War the industry flourished. Following the return of normal conditions in the United States the production decreased considerably, but in recent years has advanced greatly owing to the establishment of numerous mills for the manufacture of cotton goods (see p. 209). The exports of the product for 1914 totaled $8,332,812; 1915, $1,374,159; and 1916, $575,991. The decrease in exports does not prove that the production is declining. Instead, far larger quantities are being used locally owing to the growing importance of the cotton-milling industry.

Concerning the cotton industry and its future, an article that recently appeared in the London Times contained the following interesting information:

> From a casual glance at recent statistics it would appear that the cotton-growing industry of Brazil was on the down grade, but this is very far from being the case. The all-sufficient explanation of the decrease in the quantity exported is the fact that the fiber is now being manufactured in the country itself, and in this way it may prove that the war has been of the very greatest value to Brazil in introducing the capital, enterprise, and technical skill necessary to improve its home manufactures. The present development of the cotton industries is one of the most important factors in the future of the country. There is every promise of great success and ample scope for enterprise and capital.
>
> It would be a great benefit, not only to Brazil but to the world, if more attention were devoted to the production of cotton in Brazil. There is grave reason to anticipate that the world's cotton crop may prove insufficient for its needs in the near future. In Egypt and in the United States the cultivator has always to choose between cotton and wheat. With the increasing demand and higher price for wheat it becomes evident that the cotton crop is likely to be restricted.
>
> The Ministry of Agriculture has been endeavoring of late to introduce more practical methods in the cultivation of a plant for the growth of which such favorable conditions exist in the northern States. Formerly the cottons of North Brazil were looked upon in Manchester as some of the finest in the market. Latterly they have fallen away.
>
> "This decadence," wrote the Minister of Agriculture, "was due to ignorance of the proper methods of planting, to the lack of selected seeds, to failure to cultivate from seed of different varieties in order to prevent degeneration of the plant, to bad methods of opening the pods, and to the complete absence of regular preparation of the fiber, which was constantly damaged by the use of antiquated machinery or by the unskillfulness of the operators."
>
> In 1912 the Government sent a delegate on a tour of inspection through the chief cotton-producing countries with the object of studying the most modern methods employed in the cultivation, harvesting, and preparation of the plant. It also set up an experimental station for the intensive cultivation of cotton in the State of Maranhão.
>
> A contract was signed in May, 1913, between the Minister of Agriculture and Dr. Pedro de Godinho, by which the latter agreed to establish demonstration camps all over the cotton districts, presided over by competent experts.

Rice is becoming an important crop. Only a few years ago large quantities were imported. To-day the balance has swung to the export side, and the Republic is becoming one of the great centers of production.

Herva mate, known as yerba mate in Spanish-speaking countries, is also raised in large quantities and a large proportion exported. The total exports of the product in 1916 amounted to $8,909,166, most of which went to Argentina and Uruguay. Only $236 worth of the product went to the United States, as the matte has not as yet come into general use in this country.

MISCELLANEOUS AGRICULTURAL DATA.

All of the Brazilian States contain more or less extensive agricultural areas, and there remain great stretches of undeveloped territory certain in the course of time to bring considerable wealth to the Republic. Nothwithstanding the fact that virgin land still exists in abundance, very substantial progress has been made in many of the States. There are in São Paulo alone 60,500 farms, valued at upward of $900,000,000, covering an acreage of nearly 42,000,000, or more than 65,000 square miles. The agricultural production of these farms from 1912–13 to 1915–16 was as follows:

Chief products.		1912–13	1913–14	1914–15	1915–16
Coffee	bags	9,470,833	11,072,000	9,207,000	12,194,000
Corn	bushels	37,020,000	30,450,000	35,200,000	58,000,000
Beans	do	5,287,000	5,286,000	6,300,000	9,820,000
Rice	do	3,826,000	4,063,000	4,780,000	8,172,000
Sugar cane	tons	24,878	24,369	27,920	29,100
Cotton	bales	176,900	41,900	49,600	50,000
Tobacco	do	10,080	10,000	9,500	10,200

NOTE.—Bag of coffee weighs 132 pounds or 60 kilos; bushel contains 36.35 liters; bale weighs 500 pounds.

Rio Grande do Sul, one of the richest States in the Republic, although only a small part is developed, produced in 1915, according to United States Consul Lee, crops of the following values:

Products.	Value.	Products.	Value.	Products.	Value.
Maize	$38,250,000	Potatoes	$4,537,500	Beans	$272,250
Vegetables	14,250,000	Tobacco	1,139,250	Oats	73,750
Black beans	4,125,000	Wine	3,950,000	Peanuts	625,000
Herva mate	12,487,500	Barley	401,400	Birdseed	211,000
Mandioca	6,300,000	Alfalfa	3,150,000	All other products	23,125,000
Wheat	2,050,000	Lentils	1,300,000		
Sugar cane	3,000,000	Rye	285,200	Total	129,835,350
Rice	7,965,000	Onions	2,337,500		

LIVE-STOCK AND MEAT INDUSTRIES.

Few countries in the world offer better prospects for cattle farming and for the carrying on of the meat-packing industry than Brazil. Those who have seen the enormous and wonderful cattle ranges of Rio Grande do Sul and other States of the Republic can not but be enthusiastic over the outlook for the future in this field of enterprise. American interests have realized the opportunities existing and have taken a leading position in developing them. Some of the American companies that have entered the field have embarked in the manufacture of all kinds of by-products of the beef and have equipped their plants to handle a very large amount of business.

It has been recently estimated that the number of cattle within the boundaries of Brazil would not fall short of 31,000,000, or about 3.6 per square kilometer, compared with 11 per square kilometer in Argentina and 7 per square kilometer in Uruguay. The total number of cattle, as above, compares with approximately 22,000,000 in 1912.

CATTLE RAISING IN RIO GRANDE DO SUL.

Rio Grande do Sul has taken the lead as a cattle-producing State, but several other States are not far behind it. Efforts are being made to improve the stock through the importation of fine breeding steers, and this is beginning to show excellent results.

During 1916 exports of frozen meat reached a total of 34,000 tons, valued at about $7,500,000, and these figures have been more than doubled during 1917. The total value of beef products of the State of Rio Grande do Sul for 1916 was estimated at $10,000,000, a large portion of which was shipped to Great Britain and Italy.

There follows a report by United States Consul Samuel T. Lee concerning the progress of the beef and cattle industries in Rio Grande do Sul (report dated July 2, 1917):

The leading source of wealth in the State of Rio Grande do Sul (the area of which is equal to twice that of Pennsylvania) is the production of xarque, or jerked beef, and such animal by-products as hides, horns, bones, tallow, lard, glue, cattle hair, wool, and sheepskins.

This is essentially a cattle region, and since first settled has supplied large amounts of jerked beef to other sections of Brazil and neighboring countries. The records of this consulate indicate that as far back as 1829 small United States sailing vessels coming to this port carried on an active trade in dry cattle hides. There has never been a market in the United States for jerked beef, however, and this article has been sold mostly to other States of Brazil and to Cuba.

The increasing problem of the future meat supply of the world is bringing southern Brazil into prominence as one of the few remaining and only partly developed tracts of good range land in North or South America for the raising of beef cattle on a large scale on open ranches. Although this district is completely within the South Temperate Zone, no winter feeding of range cattle is required. This territory is practically free from cattle diseases and in the near future will be a large producer of frozen meats for consumption in the United States.

Large American meat packers have acquired important holdings in Rio Grande do Sul at Livramento, Rosario, Rio Grande, and other places. Modern refrigerating plants are being constructed at Livramento and Rio Grande, and gradually many of the numerous jerked-beef plants (saladeros or xarqueadas) elsewhere will be transformed into modern establishments. The cattlemen are aware of the changing conditions and demands, and are improving their herds by the introduction of high-grade stock.

The number of cattle in Rio Grande do Sul has gradually increased until the total for the entire State was officially reported to be 8,057,062 on December 31, 1916; in 1908 the number was 6,199,410; in 1910, 6,574,954; in 1912, 7,023,209; in 1914, 7,529,702; and in 1915, 7,917,298. On December 31, 1916, the official statistics show the number of other live stock in this State as follows: Sheep, 4,241,386; swine, 3,832,144; horses, 1,195,205; mules, 315,077; and goats, 121,128.

Cattle were slaughtered in jerked-beef establishments during the years given in the following numbers: 1907, 598,080; 1910, 673,580; 1912, 804,264; 1914, 510,885; and in 1916, 457,958. The decline for the last four years is accounted for by the increasing amount of canned beef produced. It is estimated that between 350,000 and 400,000 head are killed each year for domestic consumption.

The following table shows the value of the jerked beef, or xarque, produced from 1907 to 1916:

Years.	Exported from State.	For local consumption.	Total.	Years.	Exported from State.	For local consumption.	Total.
1907	$5,741,489	$1,014,281	$6,755,770	1912	$7,885,048	$1,302,253	$9,187,301
1908	6,337,612	807,126	7,144,738	1913	7,937,816	675,034	8,612,850
1909	6,227,188	936,362	7,163,550	1914	5,928,224	2,286,212	8,214,436
1910	6,096,829	1,171,797	7,268,626	1915	6,994,052	2,257,821	9,251,873
1911	6,578,282	1,465,277	8,043,559	1916	7,374,410	2,908,044	10,282,454

LIVE-STOCK INDUSTRY IN SAO PAULO AND MATTO GROSSO.

Further information concerning the live-stock industry of southern Brazil is given by United States Consul Charles L. Hoover (São Paulo, 1917):

The industry that bids fair to become the most important in the State of São Paulo is stock raising, especially the production of meat animals. Two packing houses, which slaughter 300,000 cattle per year, have been established there; one is owned and operated by Americans. Another American company has purchased land in the city of São Paulo for a plant that will handle 1,500 head of cattle, 1,000 hogs, and 2,500 sheep daily.

It is estimated that there are 2,500,000 cattle in the territory tributary to São Paulo, although there is no way of ascertaining the exact number. The best breeding grounds for this region are located in Matto Grosso, where the cattle virtually run wild, as formerly in Texas. Each rancher holds a certain range and endeavors to keep his own cattle confined thereon and to mark them with his own brand. One American company controls several million acres and possesses about 500,000 cattle.

Before the packing houses were started in São Paulo, the cattle on these ranges were useless except for the production of jerked beef, or xarque. For jerked beef, the leaner the animal the better, and consequently no effort was made to improve the breed until the need of it was foreseen if the herds were ever to become profitable through the location of refrigerating plants in this region, and work was begun in a systematic way. Both the Brazilian and the São Paulo Governments have not only sought the types best adapted to the country, but they have encouraged the progressive ranchers to import on their own account by paying transportation costs and remitting customs duties. As a result, a number of breeding farms have been started from which thousands of males are sent up to the range country every year, and grade cattle are now received in large numbers. Many different breeds have been tried, but it seems that whatever strain of European cattle may be selected to give body to the animal and quality to the beef, a cross with the zebu, or Indian cow, is necessary, as this animal best resists the fever and the berne fly. The zebu attains a large size, and its smooth skin produces excellent leather.

From the breeding ranges in Matto Grosso the cattle are driven in large herds to the fattening pastures in the southwestern part of Minas Geraes and the northwestern part of São Paulo. It is the preparation of these pastures that places cattle raising on a large scale there beyond the reach of the man of small means. They are originally open country and the wild grass is poor in quality. Thousands of miles of barbed-wire fence have been constructed; the land is plowed (disk plows pulled by tractors are frequently used), then fertilized and planted to grass.

According to recent statistics there are about 2,000,000 hogs and about 300,000 sheep in São Paulo. An American company is engaged in the sheep-raising industry and has purchased some 15,000 ewes of native stock, which it proposes to cross with imported breeds. This company's property is located in the southern part of the State.

SHEEP AND HOGS IN BRAZIL.

In addition to the 31,000,000 cattle in the Republic, there are, it is estimated, 11,000,000 sheep and about 18,500,000 hogs. The number of sheep per square kilometer in Brazil, 1.25, compares with 22 in Argentina and 18 in Uruguay. There are still considerable areas of good sheep pasture land, and this branch of the live-stock industry should develop in the future. The number of hogs per square kilometer in Brazil is 2.16, this comparing with 0.5 in Argentina and 0.3 in Uruguay.

BRITISH INTERESTS.

Great Britain is interested in the Brazilian meat industry, probably its largest company in the field being the Brazilian Extract of Meat & Hide Factory (Ltd.). This company holds a concession from the Brazilian Government to make meat extract following the Liebig method and owns a factory at Paredao, near Porto Alegre, that is engaged in making this product and jerked beef. The company was incorporated in 1887, and its present capitalization consists of £21,109 shares and £23,000 debentures. The dividend payments in recent years have been irregular.

OPERATIONS OF BRAZIL LAND, CATTLE & PACKING CO.

The Brazil Railway, at the time of commencing operations, purchased through a subsidiary, the Brazil Land, Cattle & Packing Co., large areas of cattle-grazing lands. These cattle lands, the total acreage of which just prior to the receivership of the Brazil Railway was 8,163,081, are in the States of Parana, Matto Grosso, and Minas Geraes. The company stocked these lands with fully 200,000 head of native cattle and about 1,000 pure-bred imported cattle.

The lands selected were mostly well watered and, with the exception of portions here and there in Matto Grosso, which were covered with valuable hardwood timber, were excellent grazing lands.

Prior to the receivership the property was generally divided into ranches, a large amount of fencing was done, and necessary buildings were erected.

Since the outbreak of the war the increased prices received for this company's products have aided it materially and its outlook may be said to be extremely bright. The Brazil Land, Cattle & Packing Co. owns 77½ per cent of the shares of the Continental Products Co., the remainder being held by Wilson & Co., of the United States. The plant of the Products Co. is located near São Paulo and is expected to prove highly profitable.

In addition to owning all of the share capital, the Brazil Railway owns 90 per cent of the Brazil Land, Cattle & Packing Co.'s outstanding bonds.

REPORTS BY AMERICAN CONSUL GENERAL.

Concerning the cattle industry, Consul General Alfred L. M. Gottschalk, of Rio de Janeiro, furnished under date of January 4, 1917, an interesting report. Extracts from this report are here given:

Brazil to-day offers a field rich in possibilities for the cattle industry. The only existing census of the herds in the Republic sets their total at 30,000,000, but the number is undoubtedly larger than that.

It is thought in some quarters that a newer cattle census will tend to show that not only the rolling plains of southern Brazil which border upon Uruguay, Argentina, and Paraguay, but also a vastly more extensive central and tropical highland region, including the States of Matto Grosso, Goyaz, parts of Minas Geraes, and perhaps also the western portion of São Paulo, may prove in time to be valuable cattle ranges.

In these States are vast lands still undevoted to agriculture. Frost is practically unknown there. A special pasture adapted to the Brazilian soil and climate, the caipim gordura ("fattening grass"), as it is popularly called, grows there all the year round and keeps the cattle constantly in fit condition for slaughter. South of the State of Parana the frosts, although not heavy, interfere with the growth of this grass, and the cattle therefore have their lean and fat periods. This is precisely what meat exporters do not want.

The question of the relative pasture value of the various Brazilian ranges, as affected by the necessity of providing for the support of a presumably largely-increased national herd, seems most vital at present. The determination of the section of the country that is really to be the future seat of the cattle industry will decide the building of roads and the location of the most favorable exporting points.

LIST OF PACKING HOUSES.

In the country at present, actually in operation or projected, are the following packing houses or frigorificos:

At Ossasco, State of São Paulo, a joint interest of Wilson & Co. with the Brazil Railway (American).

At Barretos, State of São Paulo, a plant capitalized and conducted by Senhor Conselheiro Prado and his associates (Brazilian).

At Rio Grande do Sul, the location selected by Swift & Co., of Chicago, for the erection of its new plant (American).

At Pelotas, State of Rio Grande do Sul, a project on the part of the União dos Criadores (Ranchmen's Society) of the State, which has not yet taken complete form (Brazilian).

At Santa Anna, State of Rio Grande do Sul (near the Uruguayan border), the probable location of a packing house to be erected soon by Armour & Co., of Chicago (American).

At Mendes, State of Rio de Janeiro, on the Central Railway of Brazil, about 80 kilometers from Rio de Janeiro, a packing plant, now in the course of construction (some of the buildings were formerly used as a brewery), of which little is known. Mr. Vestey, of Chicago, is said to be concerned, with English partners. The plant is expected to commence slaughtering in May, 1917, and will have a capacity of 500 head per day. The interests are now represented here by Mr. F. Ellis, an English citizen.

At Rio de Janeiro a chilling and freezing plant of modern type, the property of the Port Co. (one of the subsidiary companies of the Brazil Railway), which does not slaughter or use by-products, but merely chills and freezes for export the cattle slaughtered at the municipal slaughterhouse of Santa Cruz, near Rio de Janeiro (French company).

Each of these companies has selected a location where it expects it will find the greatest number of cattle at the lowest price, but at the present stage of development it is difficult to prophesy as to which of these locations will eventually prove to have the most commanding position.

MEASURES TAKEN BY STATES AND CONCESSIONS OFFERED.

Dr. Affonso A. Camargo, president of the State of Parana, has been extending the high roads leading out from his capital, Curitiba, toward Goarapoava, so as to tap the State of Matto Grosso, and already, with evident success, he has had a large drove of Matto Grosso cattle brought down on the hoof at a favorable price from Porto de Monjolli on the border of that State. He desires to have an American packing house settle in his State, and proposes, if any suitable firm approaches him with a proposition, to give it legal guaranties that the present State export duties and charges (about 4 per cent or less) shall not be increased in any way for a term of 15 years.

Curitiba's port is Paranagua, which is 2½ hours distant by rail. A very fair harbor there is used by the Brazilian coastwise shipping companies (Costeira, Commercio e Navegação, and Lloyd Brasileiro) and the Funch-Edye line of steamers out of New York, which have been bringing between 800 and 1,200 tons of American general cargo to Paranagua per month.

Similar concessions were offered by Col. Felippe Schmidt, governor of the State of Santa Catharina, the port and capital of which is Florianopolis. The duties on exports in that State are even lower, generally, than in Parana, and the tendency is to do away with them altogether on many articles.

In the State of Rio Grande do Sul the present acting governor, Gen. Salvador Ayres Pinheiro-Machado, has signed a bill giving to any foreign meat-packing industries that might settle in the State 30 years' exemption from export taxes of all sorts. The State, however, in obedience to the interests of its large ranch owners, finds it necessary to reserve to itself the right of subsidizing any purely native industry of this sort that might later develop and has already imposed a tax of 10 milreis ($2.50 United States currency) upon every cow under 10 years of age slaughtered, in order to protect its herd from decimation by the meat-packing business.

QUALITY OF CATTLE.

A question often asked by representatives of American meat-packing interests who have visited the country is: "When may we count on getting well-bred cattle here?" Men with a very considerable experience in the southwest of the United States, as well as in Argentina, have stated that the cattle now being slaughtered in Brazil—the ordinary native stock of the country, known as gado crioulo—compare more than favorably with Argentina's native stock of 20 years ago, before the introduction of foreign sires into Argentina had modified and improved the herd to its present type.

Much depends upon whether or not the packing plants differentiate in favor of well-bred cattle. If the packers pay as much per kilo or per pound for a fat native steer that yields 35 per cent of first-class meat as they would pay for an improved type of animal that would yield between 55 and 60 per cent of its weight in first-class meat, just so long will the improvement of the Brazilian herd be delayed.

BENEFIT FROM ADVENT OF AMERICAN PACKERS.

The advent of the American meat packers into the country will naturally mean a visible economic benefit. The only thing for them to do is to prove to Brazil that they have at heart the stable foundation of the cattle business in the country, since they hope to be sharers in its future. From three American sources, two of which are large meat-packing establishments, the consulate general has been approached with a request to offer in their names to the Brazilian National Society of Agriculture handsome prizes to be awarded for good cross-bred stock at the cattle fair. These prizes have been gratefully accepted.

SLAUGHTERING WILL NOT INVOLVE DIMINUTION OF HERD.

It seems clear that the Brazilian herd will be able to stand the drain of the packing houses upon it and still not suffer numerically. Assuming the present herd to be of only 21,000,000 head in all, a calculation made by a recognized American authority among ranchmen in Brazil, Mr. Murdo MacKenzie, has particular interest.[1] He states:

> On the assumption that Brazil has only 21,000,000 cattle and no intention of increasing this number, the number of cows that could be slaughtered annually, if the cows were not allowed to remain on the pastures longer than to attain the age of 9 years, would be 881,345, and the number of 4-year-old steers for annual slaughter would be 1,422,336, making together 2,303,681.
>
> In a herd of 21,000,000 cattle, where steers are held until 4 years old before slaughtering, there should be 7,000,000 cows. From this number of cows a calf crop of 50 per cent should be obtained, thus giving 3,500,000 calves annually. Half of this number (1,750,000) would be heifers and the other half steers. Assuming these figures to be approximately correct a surplus of 881,345 cows and 1,422,336 steers would annually be disposed of. These figures are arrived at as follows:
>
> Cows—Number of heifer calves produced, 1,750,000; less loss as yearlings at 10 per cent. 175,000; loss as twos, at 7 per cent, 110,250; loss as threes, at 7 per cent, 102,532; loss as fours, at 7 per cent, 95,355; loss as fives, at 7 per cent, 88,680; loss as sixes, at 7 per cent, 82,472; loss as sevens, at 7 per cent, 76,699; loss as eights, at 7 per cent, 71,330; loss as nines, at 7 per cent, 66,337; balance, 881,345.
>
> Steers—Number of calves, 1,750,000; loss as yearlings, at 10 per cent, 175,000; loss as twos, at 5 per cent, 78,750; loss as threes, at 3 per cent, 44,887; loss as fours, at 2 per cent, 29,027; balance, 1,422,336.
>
> If we have a surplus of 2,303,681 cows and steers to dispose of annually and allow 1,000 per working day to each packing house for slaughter, Brazil could afford to supply seven packing houses with this number and still have 112,681 head left over. These figures are arrived at by assuming that all the cattle are slaughtered by packing houses and that the herds are held at the original figure, 21,000,000, upon which the calculation has been based. If, however, the herds are increased, the output of cows will be decreased in that proportion, but this would be only for a few years, after which the output of both cows and steers would again be increased.

BRAZILIAN SHEEP INDUSTRY.

The report of Consul General Gottschalk closes with brief remarks concerning the sheep-raising industry. The raising of sheep in Brazil, he says, is still in the experimental stage. Scientific development is possible at three points—in Minas Geraes, Parana, and Matto Grosso. The last-mentioned center for the industry has 400 head. The native herds of the State of Rio Grande do Sul have been furnishing considerable wool for export.

Experiments made at the points mentioned with Romney March sheep seem to have been very successful, and this Kentish type, bred for both wool and meat, has produced some Brazilian mutton of excellent flavor. Experts believe that on the extensive ranges that the country affords these sheep could very well be pastured on the same ground with neat cattle if the herds were not too bulky.

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[1] It may be observed that Mr. MacKenzie's estimate of 21,000,000 differs from the figure (30,000,000) mentioned on page 205.

NEW PACKING HOUSES.

Under date of October 4, 1917, Consul General Gottschalk reported that two new packing houses were about to be added to the list given on page 205. One of these, he says, is to be at the town of Sitio, and the other (to have a capacity of 400 head of cattle slaughtered per day) is nearing completion at Barbacena. Both places are in the State of Minas Geraes.

The enterprise concerned is the Companhia Pecuaria e Frigorifica de Brazil, working under a concession granted it by Decree No. 11999 of March 22, 1916. Its legal domicile is in the city of Rio de Janeiro. Its purpose is to exploit slaughterhouses, packing houses, and other more or less closely related industries, and to trade in and export the products of such industries.

The company is also the possessor of the concession granted on May 10, 1910, by the State of Minas Geraes to Coronel José Horacio de Lemos. This is only a State concession, but it grants exceedingly wide powers to the concessionaires. Its capital is placed at 5,000 contos of milreis (over $1,000,000 United States currency).

The company is likewise holder of another concession originally granted to Coronel Horacio José de Lemos, for the slaughtering of cattle and the establishment of packing houses in the State of Rio de Janeiro.

TIMBER RESOURCES.

The forestal wealth of the Republic of Brazil is perhaps as great as that of any country in the world. To name and describe the various trees would require a volume. The writer, who has traveled through large forest-covered areas of Parana and Santa Catharina, can but echo the universal praise that has been bestowed on this magnificently timbered country by those who have seen it. The timber industry of Brazil, despite its wonderful prospects, is only in its infancy, and but little has thus far been exported. Concerning the forest resources of Parana and Santa Catharina, one may quote the following excerpt from a report submitted to Great Britain by His Majesty's minister to Brazil, Sir W. Haggards:

> It is only necessary to traverse the magnificent forests of Parana and Santa Catharina to be convinced of the impossibility of estimating the immense wealth of timber in these two States. The great variety of woods may be judged from the fact that I was shown by a Brazilian gentleman at Curityba no less than 72 specimens of different woods found in the State of Parana alone.
>
> Some of these were of exceptional beauty. The most valuable and abundant of all these are undoubtedly the Parana pine and the imbuya, which are found in both States. The former resembles a church candlestick, with many branches rising upward from the top, or perhaps, to use a homely simile, a blown-out umbrella, and when the trees are dead and bare of needles, they look exactly like the framework of an umbrella. Its straight trunk and freedom from limbs make it easily "handled" by the mills. It has very hard knots containing a great quanity of resin, which is used for pitch on the railway. Unlike other pines, however, it has no turpentine in sufficient quantities to make this a

marketable commodity. The actual wood is sent in large quantities to Curityba, São Paulo, and Rio de Janeiro for building purposes. The larger trees, which have a height of about 100 feet and a diameter of 3 feet or more at the base, are said to be of almost incalculable age, as the rings marking the annual growth are so close as to be nearly indistinguishable, having in some cases, however, been counted up to 2,000. The wood, like that of the imbuya, sinks in water.

The imbuya is a very hard wood, resembling mahogany, though, in my opinion, it is not as handsome as that wood.

Presumably the first important foreign concern to enter the timber industry in Brazil was the Brazil Railway, which through a subsidiary known as the Southern Brazil Lumber & Colonization Co. acquired 566,475 acres of forest land in the States of Santa Catharina and Parana. Three mills were constructed, these being known as the Tres-Barras, Calmon, and Sengas mills. By far the most important of these mills is the Tres-Barras, which has a capacity of 40,000,000 feet a year. This is located at a place with a similar name situated on a branch of the São Paulo-Rio Grande Railway. The logs are handled at the mill on a monorail system, and there have been located at this place a fully equiped planing mill and box factory, a number of dry kilns, etc.

The timber areas owned by the company are estimated to contain 5,000,000,000 feet of standing timber, much of fine quality, this quantity being sufficient to run the mill at Tres-Barras at full capacity for a century. Under normal conditions a market for the lumber should be found locally and in Uruguay and Argentina. The first exports of lumber by rail from Tres-Barras were made in May, 1913, at the opening of the railway to the port of São Francisco. During part of the war period shipments were small, and lumber held in reserve was more than sufficient for the export needs. This caused the temporary shutting down of the mills. These in 1912 produced as follows: Tres-Barras, 17,700,000 feet; Calmon, 4,800,000 feet; and Sengas, 500,000 feet.

MANUFACTURING ENTERPRISES.

Although by no means considered a manufacturing country, Brazil has made commendable progress along certain lines. Among various lines of manufacturing the textile industry has taken a high place, there having been in existence two years ago 303 factories, employing 74,609 operatives, the invested capital totaling 368,144,000 milreis and the annual output 278,289,950 milreis.

The largest concern in this field of industry, the Companhia Nacional de Tecidos de Jute, in São Paulo, has a capitalization of 26,000,000 milreis and an annual output of 14,000,000 milreis. A total of 2,800 hands are employed, the company manufacturing sacking, yarn, rope, thread, etc. The company paid a dividend of 20 milreis per share in January, 1917, its 200-milreis shares being quoted at 210 milreis (105 per cent). The company, in addition to its stock, has two issues of debentures, each for 13,000,000 milreis, bearing interest at 8 per cent and 5 per cent per annum, respectively. Interest on these issues is payable semiannually, January and July.

The cotton mills are the leaders in the textile field, their annual output totaling 237,499,000 milreis. Many of these are large companies, their shares being widely held locally and considered substantial and profitable investments. The following table, showing the capitalization and output of the most important of these cotton mills, was forwarded by United States Consul General A. L. M. Gottschalk from Rio de Janeiro in 1916:

Factories.	Location.	Capital.	Annual output.
		Milreis.	*Milreis.*
Progreso Industrial do Brasil	Rio de Janeiro	13,600,000	8,800,000
Confiança Industrial	do	13,000,000	8,500,000
Fiação e Tecidos Allianca	do	12,750,000	6,800,000
Fiação e Tecidos Botafogo [1]	do	12,000,000	10,200,000
Fabrica Volorantim	Sorocaba	10,000,000	6,400,000
Brasil Industrial	Paracamby	9,800,000	6,000,000
Companhia Petropolitana	Petropolis	9,000,000	5,000,000
Manufacturados Fluminense	Nictheroy	9,000,000	4,200,000
Fiação e Tecidos Corcovada	Rio de Janeiro	8,730,000	5,200,000
Fiação e Tecidos Carioca	do	8,400,000	6,300,000
Cotonificio Rodolpho Crespi	São Paulo	8,000,000	3,900,000
America Fabril	Rio de Janeiro	7,600,000	5,600,000
Emporio Industrial do Norte	São Salvador	6,740,000	4,000,000
Industrial Pernambucana	Camaragibe	6,000,000	3,500,000
São Bernardo Fabril	São Bernardo	5,700,000	2,500,000
Industrial Reunidas F. Matarazzo	São Paulo	5,000,000	5,400,000
Fiação e Tecidos de Pernambuco	Torre	5,000,000	4,500,000
Societa Italo-Americana	Salto de Itú	4,825,000	3,000,000
Fabril Paulista	Recife	4,600,000	4,000,000
Valençã Industrial	Valença	4,135,000	2,400,000
Estamparia Ypiranga	Bairro Ypiranga	4,000,000	2,900,000
Progreso Industrial da Bahia	São Salvador	3,742,000	3,200,000
Fabrica Paulistana	São Paulo	3,600,000	1,410,000
Fiação e Tecidos São Bento	Jundiahy	3,500,000	2,050,000
Fiação e Tecidos N. S. da Ponte	Sorocaba	3,500,000	2,000,000
Otherer Speer & Cia	do	3,410,000	2,500,000
Industrial do Rio Grande do Norte	Natal	2,800,000	720,000
Industrial Sul Mineira	Itajuba	2,800,000	981,000
Fiação e Tecidos Cometa	Petropolis	2,800,000	2,500,000
Fiação e Tecidos Mageense	Magé	2,750,000	2,600,000
Fiação e Tecidos S. Martinho	Tatuhy	2,500,000	2,000,000
Taubaté Industrial	Taubaté	2,500,000	1,085,000
Paulista Aniagen	São Paulo	2,500,000	2,000,000
Fiação e Tecidos Santo Aleixo	Santo Aleixo	2,400,000	960,000
Tecidos Porto-Alegrense	Porto Alegre	2,300,000	1,500,000
Pinotti Gamba & Cia	São Paulo	2,250,000	1,850,000
São Pedro de Alcantara	Petropolis	2,200,000	1,300,000
Industrial Mineira	Juiz de Fora	2,200,000	1,800,000
Industrial Estancia	Estancia	2,200,000	1,500,000
Alagoana de Tecidos	Cachoeira	2,000,000	2,000,000
Fabrica Maranhense	São Luiz	2,000,000	1,500,000
Fiação e Tecidos Rio Anil	do	2,000,000	1,400,000
Tecidos S. Italo-Brasileira	São Paulo	2,000,000	2,000,000

[1] Manufactures both cotton and woolen goods.

Including the Companhia Nacional de Tecidos de Jute, of which mention has been made, there are 16 jute factories in the Republic, these operating approximately 3,300 looms. The jute is mostly imported from British India. Most of the product is used by the coffee producers.

The woolen-goods industry is stated to hold forth excellent prospects, although thus far it has not assumed the importance of the cotton or weaving industries. In a report submitted under date of August 11, 1917, Consul General Gottschalk stated that there is a lack of official figures concerning the extent of this industry and the internal revenue derived from it. However, an association known as the Centro Industrial has published certain data as to number of mills, looms, and spindles, and according to these figures there were 35 woolen mills in operation in 1915, thus distributed:

Location.	Mills.	Looms.	Spindles.
Federal District	11	497	1,000
State of Minas Geraes	1	24	750
State of Rio Grande do Sul	7	322	6,800
State of Rio de Janeiro	4	144	....
State of São Paulo	12	377	1,566

Some of the above factories, however, are of relatively small importance. The industry is said to have employed 2,751 operatives in 1915.

INDUSTRIES OF SÃO PAULO.

The industries of São Paulo are extremely numerous. At least one-fifth of the 500,000 people of the capital city are engaged in manufacturing and kindred industries, and it ranks as one of the three great manufacturing cities of South America.

In his annual report for the year 1916, United States Consul Charles L. Hoover states that the 72 textile mills in the State employ 26,000 operatives and consume about 14,000 tons of cotton per year. Estimates place the value of the total production of textiles in 1916 at $22,041,360, of which $5,669,040 was represented by jute bagging and woolen, silk, and linen textiles and $16,372,320 by cotton manufactures.

In São Paulo, Mr. Hoover continues, there are 134 shops, foundries, and factories engaged in metal working. Among the articles produced are coffee-hulling machinery, small rice mills, cane mills, plows, farm tools, metal parts of railway cars, street cars, carriages, stoves, enameled sanitary ware, aluminum kitchen ware, cast-iron pipe, iron kitchen ware, brassware for buildings, offices, and machinery parts; certain textile-mill machinery, bells, machine tools, woven-wire fence, and repair parts for machinery. Iron must be imported, and during 1916 the United States was almost the sole source of supply. Some factories have small furnaces for the utilization of scrap iron and scrap brass, scrap iron being used in the production of practically all castings.

The manufacturing industries in this district include a large number of establishments, many of which are small and employ only a few workmen. The character and the number of factories follow: Hats, 269; shoes, 67; hosiery, 21; white goods and shirts, 21; gloves, 20; sugar mills, 769; sugar refineries, 309; alimentary pastes, 218; canned goods, 27; packing houses, 2; crackers, 103; preserves, 174; milling of cereals, 541; mandioca flour, 231; dairy products, 53; vinegar, 34; breweries, 270; brooms and brushes, 19; soft drinks, 200; furniture, 304; vegetable oil, 6; starch, 2; rope, 16; trunks and bags, 56; harness and saddles, 248; tanneries, 6; paper and pasteboard, 3; articles of metal, 7; machinery, 65; foundries, 62; woodworking, 558; brick and tile, 972; lime, 47; wagons and carriages, 383; railway machine shops, 18; matches, 12; soap, 195; candles, 19; oils and resins, 30; paints, 9; chemical products, 18; pharmaceutical products, 9; cigars and cigarettes, 158; and others, 932.

INDUSTRIES OF BAHIA.

United States Consul Robert Frazer, jr., in a report dated June 10, 1916, gave the following information concerning the industries of Bahia:

According to the latest statistics published on the subject (in 1913), there were at that time a total of 83 industrial establishments of different kinds in the City of Bahia, having a combined capital of about $10,000,000, an annual production of between $8,000,000 and $9,000,000, and a total of about 10,000 employees. Of the foregoing, something like 85 or 90 per cent are engaged in the textile (cotton and jute), sugar, and tobacco (cigars, cigarettes, and snuff) industries.

There are now 15 sugar mills of importance in operation in the State of Bahia, besides one in liquidation and one not working. These 15 have a total capital of $5,525,000 (at present exchange), about 800 employees (not including field workers), and a combined average annual production of about 30,000 metric tons of sugar.

There are five important textile mills at Bahia, of which one makes jute bagging and the other four cotton goods. The jute mill employs approximately 400 persons, is capitalized nominally at $125,000 (500 contos), and in 1915 declared a dividend of 24 per cent. It turns out annually approximately 20,000 pieces, containing 2,187,222 yards (2,000,000 meters) of goods. The four cotton mills each employ from 1,200 to 1,400 persons, and each turn out from 7,000,000 to 9,000,000 meters (7,655,278 to 9,842,500 yards) of goods per annum. While none of the four paid dividends in 1914, in 1915 three paid 8 per cent each and the other, although it paid no dividend, made a small profit.

RIO DE JANEIRO FLOUR MILLS & GRANARIES (LTD.).

There are a few foreign companies in the Republic interested in manufacturing. Among these may be mentioned the Rio de Janeiro Flour Mills & Granaries (Ltd.), a British company, registered in 1886. The authorized capitalization of the company is £800,000, of which £608,001 has been subscribed for and issued. The par value of the shares is £1. Approximately £25,000 of an original issue of £150,000 first-mortgage 5 per cent debentures remain outstanding. Shares were quoted in January, 1918, at 61s., this being equivalent to 305 per cent of par. Dividends have usually been at the rate of 15 per cent per annum, while in several of the years stock dividends or cash bonuses were paid. The reserve fund in 1916 amounted to £116,000 and the company was in a very prosperous condition. In 1910 the company decided to construct a cotton spinning and weaving mill and to make other improvements.

LOCAL MANUFACTURING COMPANIES

There follows a list of a few local manufacturing companies, capitalization and value of shares being indicated:

SHARES.

Companies.	Outstanding.	Par value.	Reserves.	Last sale.
	Milreis.	*Milreis.*	*Milreis.*	*Milreis.*
Armazens Frigorificos	6,000,000	200	....	....
Brasileira de Automoveis	200,000	200	4,919	200
Brasileira de Carnes Congeladas	1,000,000	100	....	103
Brasil de Telegrapho sem fio	300,000	200	....	....
Docas de Santos	60,000,000	200	....	451
Explosivos de Segurança	600,000	100	11,815	....
		100	....	....
Geral de Melhoramentos do Maranhão	3,200,000	100	497,337	40
Geral de Melhoramentos de Pernambuco	6,000,000	200	....	30
Industrial de Melhoramentos no Brasil	1,000,000	100	516,872	89
Melhoramentos na Bahia	6,000,000	200	....	....
Melhoramentos no Espirito Santo	250,000	200	300,000	....
Melhoramentos de São Paulo	6,000,000	200	....	....
Porto de Victoria	3,000,000	200	....	....
Sampaio Correa & Cia	1,350,000	200	....	....
Technica e Importadora	200,000	200	....	....
Viação e Construcções	1,500,000	200	2,152,523	....

DEBENTURES.

Companies.	Issues.	Total number.	Outstanding.	Par value.	Last sale.
	Milreis.			*Milreis.*	*Milreis.*
Armazens Frigorificos	6,000,000	30,000	All.	200	....
Brasileira Auto-Viação	1,000,000	5,000	All.	200	200
Brasileira de Minas	1,200,000	6,000	4,000	200	....
Caminho Aereo Pão de Assucar	360,000	3,600	All.	100	....
Centro Pastoris do Brasil	200,000	1,000	778	200	190
Docas de Santos	60,000,000	300,000	All.	200	206
Geral Melhoramentos em Pernambuco	[a] 8,000,000	16,000	All.	[a] 500	....

[a] Francs.

SUMMARY.

This report has briefly outlined the development of the manufacturing industries of Brazil and has in a general way called attention to opportunities in the field. That expansion along manufacturing lines is certain is indicated by the general prosperity of the companies now in the field and the realization on the part of the people of the country that they are no longer wholly dependent on outside sources for their goods. Although the fuel problem has not yet been satisfactorily solved, the possible development of the coal mines and the vast amount of available water power will in time probably overcome these difficulties.

FOREIGN INVESTMENTS IN BRAZIL.

The great undeveloped and partly developed resources of the Republic of Brazil have proved a magnet to attract considerable sums of foreign capital. Great Britain and France have, as usual, taken the lead. Listings of Brazilian bonds and stocks on the London Stock Exchange amount to more than $1,150,000,000, a sum that is believed, however, to be greater than the total of British investments in the country. Most of the Government bonds and some of the railway securities are also quoted in Continental markets, and many are held outside of Great Britain. Perhaps $750,000,000 would be a fair and conservative estimate of British investments in Brazil, and as has been indicated in this report, these cover almost every field of enterprise.

France has long favored Brazil, in preference to other South American countries, and its citizens are the holders of very large amounts of Government, State, and municipal bonds and securities of railways, banks, etc. Estimates of the aggregate of French capital in the field vary from $400,000,000 to $900,000,000. Probably $500,000,000 would be a conservative figure.

Belgium is the holder of Government bonds and has a large interest in the Brazil Railway and a few other enterprises. There is probably $150,000,000 of Belgian money in Brazil.

German influences in Brazilian investments have been considerable. Some of the Government bonds are held in Germany, the Teutonic chain of banks are important, and Germans residing either in the home country or Brazil have more or less extensively developed southern Brazil and are interested in public utilities, plantations, etc. One of the two German-owned railways in South America is located in Brazil. This line, the Blumenau Railway, is located in the State of Santa Catharina. The builder of this railway, which is 70 kilometers (44 miles) in length, received the official congratulations of the German Government and a decoration from the Kaiser at the date of the opening of the road for through traffic. Following the declaration of war by Brazil, the line was taken over by the Brazilian Government. Although no estimates of the aggregate capital investments of Germany in Brazil are available, it is safe to state that British and French interests in the field are considerably larger and more important.

There is a certain amount of Portuguese capital in Brazil. The relationship between the two countries is close, their interests are somewhat allied in a general way, and their language is the same. The Banco Ultramarino, a powerful and successful bank, is probably the most important Portuguese financial institution in the Republic. Portuguese capital is also said to be invested in guaranteed mortgages, coffee estates, etc.

Italian investments are principally confined to the State of São Paulo and neighboring districts. Italy has been a powerful factor in the development of the coffee district and is in no small way responsible for the progress of the city of São Paulo. Its banks are strong and profitable and form the keystone for Italian enterprise.

The United States during recent years has realized the potential wealth of Brazil and is to-day rapidly becoming a factor in its development. Cattle raising and meat packing, mining, and other fields of enterprise have attracted the attention of American financiers, and the National City Bank, with its several Brazilian branches, has assumed considerable importance. American investors hold bonds of the city of São Paulo, notes of the Brazilian Traction, Light & Power Co., and a few other Brazilian securities. The Brazil Railway, although incorporated in Maine, was practically wholly financed abroad, as were most of the Farquhar-Pearson enterprises. There is probably $50,000,000 of American capital in Brazil, although this figure is simply an estimate.

The Brazilian Traction, Light & Power Co. is a Canadian enterprise, although large amounts of its securities are held in Great

Britain, the United States, and Brazil. With the exception of another public-utility company, it is the only important Canadian enterprise in the field.

The foregoing report has indicated that the amounts of local Brazilian capital invested in manufacturing and other fields of enterprise are surprisingly large. Such companies as the Companhia Docas de Santos and the Companhia Nacional Tecidos de Jute have been highly successful. There is probably more than $100,000,000 of local capital invested in the textile industry, and there is considerable home capital in Government, State, and municipal securities, railways, public utilities, banks, insurance companies, etc.

As a final word it need only be said that Brazil is one of the largest and richest countries in the world and that opportunities to develop its marvelous resources are unlimited.

CHILE.

INTRODUCTION.

The Republic of Chile, with an area of approximately 292,500 square miles, is situated along a narrow stretch of land between the Andes and the Pacific Ocean, extending in the general direction of north and south for about 2,700 miles. The width of the country varies from about 65 to nearly 250 miles. The coast line of the Republic may be said to be 23 times greater than its average breadth. If one sailed from the cost of Labrador southward to the Guianas in South America he would cover no greater distance than if he had followed this length of the Chilean coast.

Chile's 3,870,023 inhabitants make up one of the hardiest and most progressive races in the Western Hemisphere. The country is developing fast, especially in the production and exportation of its vast mineral wealth. During the century 1810 to 1910 the mineral production of the Republic has been estimated as follows: Nitrate (since year 1830 only), $1,225,300,000; copper, $664,292,000; silver, $298,695,000; coal, $114,516,000; gold, $68,084,000. In addition, large quantities of borax, salt, iodine, sulphur, iron, manganese, etc., are taken from the earth. The Republic may be divided into four distinct zones, as follows:

The northern or desert zone, extending from 17° 15′ to 27° south latitude. In this zone are the cities of Iquique, Antofagasta, Taltal, etc. Herein are located the nitrate belt and very extensive deposits of copper, especially those found at the mines of the Chile Copper Co. at Chuquicamata. The country is virtually rainless and barren of vegetation, no rivers of any importance existing. Nevertheless, this zone is the center of the greatest natural wealth of the entire Republic. Several railways traverse the district and steamship service is excellent.

The second or mineral zone extends from the southern boundary of the desert zone as far south as 33°. Minerals of all descriptions are found in this district. The country is generally arid, although there is a fair amount of cultivation in the Central Valley.

The south-central or agricultural zone extends from 33° to 42° south, and in it are included the cities of Valparaiso and Santiago and the rich and fertile Central Valley. This valley contains a number of important rivers, some of which are navigable. In addition to its agricultural areas the Central Valley contains coal and other minerals and large timber areas.

The southern or island zone extends from 42° south to Cape Horn. This district, which includes the island of Tierra del Fuego and the territory of Magallanes, with their immense areas of sheep-grazing lands, is quite thinly populated.

Chilean foreign trade in 1917 reached the record total of $389,588,610. The previous record figure was for 1916, with a total for exports and imports of $268,678,534. In 1912 and 1913 Chilean foreign trade amounted to $261,954,195 and $264,927,313, respectively. In 1917 the exports amounted to $259,985,495 and the imports to $129,603,115; the United States furnished $63,534,755 worth of the imports and took $155,006,103 worth of the exports.

FINANCES AND PUBLIC DEBT.

As an indication of the national income, expenditure, and public debt of Chile the following table is submitted. The heavy decrease in national income during the years 1915 and 1914 may be attributed almost wholly to the decrease in customs receipts resulting from the European war. The figures are expressed in Chilean gold pesos of 18d. (equal to $0.365 United States currency):

Years.	Income.	Expenditure.	Public debt.
	Gold pesos.	*Gold pesos.*	*Gold pesos.*
1911	197,502,232	199,013,800	575,658,400
1912	228,295,252	235,126,800	567,818,100
1913	220,173,450	215,476,800	625,819,200
1914	141,008,723	175,461,800	616,481,600
1915	124,543,108	175,534,908	607,449,003

Customs receipts for 1915 amounted to 91,397,396 Chilean gold pesos, as compared with 159,259,254 pesos in 1913. The general national income for 1916 was much larger than for 1915, and a surplus was stated to have been shown, although figures at the date of writing are not available. There was an increase in customhouse revenue of approximately 48,000,000 Chilean gold pesos, of which increase $33,000,000 was derived from the increased exports of nitrate. The total tax on the exportation of nitrate for 1916 amounted to 100,273,707 Chilean gold pesos. The receipts and expenditures of the Government for the year 1917 were estimated as follows:

	Paper pesos.	Gold pesos of 18d.
Receipts	128,550,000	81,540,000
Expenditures	194,284,356	70,825,014

Of the estimated expenditures as stated above, 3,846,000 paper pesos and 22,463,000 gold pesos have been provided by loans and special legislation.

The national assets of Chile were estimated as of December 31, 1915, to be valued at 417,675,275 paper pesos and 828,105,405 gold pesos of 18d. State railways were valued at 32,194,946 paper pesos and 228,105,405 gold pesos of 18d. In addition, the Arica-La Paz Railway was carried at a valuation of 73,853,153 paper pesos.

The conversion fund, as of December 31, 1915, was held as follows: In Great Britain, £6,019,727; in Germany, 41,708,692 marks; in Chile, 3,643,634 gold pesos.

A total of 150,000,000 paper pesos were in circulation December 31, 1915.

A brief résumé of the funded debt and responsibilities of the State follows:

Character of obligations.	Amount.
EXTERNAL DEBT, DEC. 31, 1915.	
External bonds [a]	£32,556,380
Treasury bills [b]	2,000,000
Total	34,556,380
RESPONSIBILITIES OF STATE.	
(*a*) In pounds sterling:	
North Longitudinal Railway	3,055,750
South Longitudinal Railway	4,026,000
Chilean Transandine Railway	967,140
Total	8,048,890
(*b*) In Chilean gold of 18d.:	*Gold pesos.*
Bonds	5,616,000
RESPONSIBILITIES OF STATE—CON.	
(*b*) In Chilean gold of 18d—Con.	*Gold pesos.*
Paper money, four series	150,000,000
Deficit in account current	49,227,840
Total	204,843,840
(*c*) In currency:	*Paper pesos.*
Annuities	34,507,735
3 per cent loan	1,354,858
Mortgage loan	1,997,827
Model-houses bonds	2,804,300
Deficit in accounts current	34,721,000
Miscellaneous	853,119
Total	76,238,839

[a] General description in later paragraph.
[b] Five per cent; matured Dec. 31, 1916.

The rate of exchange for the paper peso is subject to wide fluctuations. As of January 1, 1918, the value was $0.2825 United States currency per peso, as compared with $0.213 April 20, 1917, and $0.14 July 1, 1916. By July 1, 1918, the exchange rate had risen to about $0.33.

The total debt of Chile as of December 31, 1915, including the 150,000,000 paper pesos of money outstanding, amounted to 607,449,003 gold pesos, equal to 166.81 gold pesos per head of population.

EXTERNAL LOANS.

The external loans of the Republic, dates of issue, amounts originally issued and outstanding December 31, 1915, are as follows[1]:

Date of issue.	Interest rate.	Amortization.	Original issue (pounds sterling).	Amount outstanding Dec. 31, 1915.
	Per cent.	*Per cent.*		
(1) 1885	4½	½	£808,900	£489,500
(2) 1886	4½	½	6,010,000	3,950,400
(3) 1887	4½	½	1,160,200	766,000
(4) 1889	4½	½	1,546,400	1,178,460
(5) 1892	5	½	1,800,000	1,386,700
(6) 1892	6	1	149,000	80,000
(7) 1893	4½	½	630,000	470,600
(8) 1895	4½	½	2,000,000	1,593,400
(9) 1896	4½	½	265,000	213,740
(10) 1896	5	½	4,000,000	3,326,100
(11) 1896	5½	2	200,000	51,700
(12) 1905	5	1	1,350,000	1,214,000
(13) 1906	4½	2	3,700,000	2,737,320
(14) 1909	5	½	3,000,000	2,892,400
(15) 1910	5	1	2,600,000	2,446,700
(16) 1910	4½	1½	275,000	253,200
(17) 1911	5	1	4,905,000	4,681,240
(18) 1911	5	1	5,000,000	4,825,220
Total	....	....	39,399,500	32,556,680

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[1] EDITOR'S NOTE.—Figures that have become available since the preparation of the text of this report show that Chilean external bonds outstanding December, 1916, amounted to £31,808,640, representing unpaid portions of 18 different loans dating from 1885. Two of these loans were placed through the Deutsche Bank and most of the others through London concerns. In addition, treasury bills amounted to £676,090 (1916), making a total of £32,484,730. The internal debt December, 1916, amounted to £16,227,000, 155,505,408 gold pesos, and 73,558,361 paper pesos. Municipal loans December, 1916, were as follows: Consolidated debt, 21,119,594 gold pesos; floating debt, 12,863,628 paper pesos.

Interest and sinking funds for the loans numbered 1, 6, and 7 are payable at the London City and Midland Bank, London, England; for the loans numbered 4 and 13 at the Deutsche Bank, Germany; for the loan numbered 11 at J. Henry Schroeder & Co., London, England. N. M. Rothschild & Sons are the bankers for all of the other Chilean loans listed above.

The sinking funds applicable to the above loans are cumulative, the bonds being drawn for redemption at par. In most cases the Government may retire the issues as a whole at par. Interest on all of the issues is payable in sterling, although the loans numbered 4, 9, 13, 14, 15, 17, and 18 are also payable in marks. The loans numbered 9, 14, 15, 17, and 18 are payable in Paris as well as in London and Berlin. Holders of the bonds numbered 14, 15, 17, and 18 may also cash them at Brussels and Amsterdam. The debt amortized by means of the above-mentioned sinking fund to December 31, 1915, totaled £6,843,120. During the year 1915, £720,660 bonds were amortized.

The 4½ per cent loan of 1885 was issued for the purpose of consolidating old loans. The bonds were brought out by the London City and Midland Bank and the original offering price was 89. The highest price for them since January, 1911, was par. The quotation January, 1918, was 89 (London Stock Exchange). The 1886 loan (issued by N. M. Rothschild & Sons) was also for consolidation purposes. The issue price was 98½, and 90 was the approximate price in January, 1918.

Loan number 3, the 1887 issue, is known as the Tarapaca Saltpetre Works loan. Its original price was 97½ and the January, 1918, London quotation about 86.

The 4½ per cent bonds of 1889 were originally offered by the Deutsche Bank in Berlin and London. Most of the bonds are held in Germany, in which country the sinking fund is operated. The original issue was for 31,546,396 marks, and the offering price was approximately 102 per cent. The London quotation for the bonds January, 1918, was approximately 79 per cent. The high price since 1911 was 99.

The 5 per cent loan of 1892, issued shortly after the close of the Chilean Revolution, was offered publicly by N. M. Rothschild & Sons in London at 95 per cent. The high price of the bonds since 1911 was 104 per cent. The quotation January, 1918, was 93.

The 4½ per cent loan of 1893 was issued to the Peruvian Corporation in part settlement of the debt of Peru accumulated prior to the war between Chile and Peru. The corporation resold these bonds through the London City and Midland Bank, some at 84½ and others, following the rise in the price of Chilean securities, at 94. These bonds have sold as high as 98 since January, 1911, and in January, 1918, were quoted at approximately 89.

The 4½ per cent loan of 1895 and the 5 per cent loan of 1896 were both publicly offered by N. M. Rothschild & Sons, the former loan at 93½ per cent and the latter at 95½ per cent; 82 and 88 were the approximate January, 1918. prices, and 98 and 103½, respectively, the high prices since 1911. A large portion of the 1896 loan is held on the Continent, in Paris, Berlin, Amsterdam, Brussels, etc.

The 5 per cent loan of 1905 was issued at 95½ and offered for public subscription in Chile, as well as in London and Paris; 86 was the approximate London quotation January, 1918. The 4½ per cent loan of 1906 differs from most of the other loans in that the sinking fund amounts to 2 per cent per annum, cumulative. The bonds were offered for public subscription at approximately 94½ by the Deutsche Bank in Berlin and by Speyer Bros. in London. The January, 1918, quotation was 77–79. The high price since 1911 was 98.

The £3,000,000 5 per cent loan of 1909 was issued to provide funds for the reconstruction of Valparaiso following the earthquake of 1908. The bonds were offered at 96½ for public subscription in London, Berlin, Paris, Hamburg, Amsterdam, and Chile. The January, 1918, quotation on the London Stock Exchange was 86. The high price since 1911 was 103.

The 5 per cent loan of 1910 was issued to provide funds for the construction of the Arica-La Paz railway and to provide additional funds for the reconstruction and improvement of Valparaiso. The bonds were offered in London, in the Continental cities mentioned in the paragraph next above, and in Brussels at 99. The January, 1918, price was 86 (high since 1911, 104).

The two issues of 1911 were for the purpose of building certain port works, also for public improvements at Santiago, Valparaiso, and Valdivia. The port improvements included the development of the harbor of San Antonio and the construction of docks there. This port is intended as a place of entry for goods destined to Santiago, the idea being to reduce the congestion at Valparaiso and reduce transportation charges. The bonds were issued at 98½ by N. M. Rothschild & Sons in the cities enumerated in the two preceding paragraphs. Both issues sold as high as 103½ and were quoted January, 1918, at 86.

The other external bond issues were for the purpose of purchasing the Copiapo Railway, the Coquimbo Railway, etc. These small issues are not actively traded in on the European stock exchanges. The January, 1918, quotation for the Coquimbo Railway issue was 72–75.

INTERNAL LOANS OUTSTANDING.

The internal obligations of the Republic have been listed in a preceding paragraph. The internal bonds are known as the Treaty of Peace Chile-Bolivia 5 per cent issue. The original amount was 6,500,000 gold pesos, of which 5,616,000 were outstanding December 31, 1915. The 3 per cent debt authorized under the law of 1837 was originally outstanding to the amount of 4,266,245 paper pesos. Approximately 1,250,000 paper pesos bonds were outstanding in April, 1917.

MUNICIPAL FINANCES AND LOANS.

On several occasions Chilean municipalities have been borrowers abroad. The loans are, as a rule, guaranteed by the Republic. Such obligations have enjoyed a ready market. The debts of the principal municipalities as of December 31, 1914 (latest data obtainable), were as follows:

Municipalities.	Consolidated debt.		Floating debt, paper pesos.	Total paper pesos.	Total gold pesos.
	Paper pesos.	Gold pesos of 18d.			
Tacna		33,018			33,018
Arica	57,106			57,106	
Antofagasta		2,666,667	297,718	297,718	2,666,667
Tocopilla			60,000	60,000	
Taltal			22,284	22,284	
Santa Luisa	13,479		10,000	23,479	
Chanaral	20,000			20,000	
Caldera			12,000	12,000	
Quillota	57,915		21,265	79,180	
Valparaiso	1,321,000		4,175,871	5,496,871	
Vina del Mar	3,824,105		969,907	4,794,012	
Santiago	7,312,200		5,309,300	12,621,500	
Providencia	273,292		22,250	295,542	
Rancagua			22,000	22,000	
Talca	670,171		14,792	684,963	
Concepcion			132,134	132,134	
Penco	4,881		30,000	34,881	
Temuco	220,763		150,000	370,763	
Valdivia			11,718	11,718	
Puerto Montt	11,520			11,520	
Ancud (Chiloe Island)			4,111	4,111	
Punta Arenas	830,320		390,000	1,220,320	
Total, including other municipalities	14,651,192	2,699,684	11,746,854	26,398,046	2,699,684

Antofagasta (population 75,000) has outstanding a loan of £200,000, bearing interest at 5 per cent per annum. These bonds are to be retired by December 31, 1939, by means of a 2 per cent sinking fund. The bonds are unconditionally guaranteed as to principal and interest by the Government of Chile, and interest is payable at William Deacon's Bank (Ltd.), of London. The issuance price was 97, and the purpose of the loan was to provide funds for street paving, bathing houses, various municipal improvements, etc. The bonds sold January, 1918, on the London Stock Exchange at 91. Approximately £186,000 remained outstanding January, 1918. The ratable value of property was stated to be £4,630,000. The city has no other external debt. Local taxes on alcohol, etc., are provided for the service of the loan.

Valparaiso has a small external loan, which is largely held in Great Britain. The bonds bear interest at 5½ per cent per annum, payable in sterling. The original issue was £200,000, of which all except approximately £39,400 have been retired through a sinking fund. The bonds, which are extremely inactive, sold at 94 in January, 1918. Interest has been regularly paid.

In October, 1916, the Guaranty Trust Co. of New York purchased from the Water Board of Valparaiso $471,000 United States gold 6 per cent bonds, redeemable in 1939 or earlier through the operations of an annual sinking fund. The loan was offered in New York on a 6.30 per cent basis. The bonds are unconditionally guaranteed as to principal and interest by the Republic of Chile. The proceeds will be used to enlarge and further develop the waterworks.

Practically the entire water supply of the city of Valparaiso is served by this water system. The water board is administered by a board of directors consisting of (1) the governor of the Province, (2) three citizens of Valparaiso appointed to office by the National Government, and (3) another director appointed by the municipality itself.

In 1912, £250,000 5½ per cent bonds of the Valparaiso Water Board were sold in London at 99, being publicly offered by J. Henry Schroeder & Co. The bonds are unconditionally guaranteed as to principal and interest by the Government and are being retired annually by means of a sinking fund, which will amortize the entire issue prior to October 1, 1930. Interest is payable April and October. Approximately £225,000 of the bonds remained outstanding January, 1918. The bonds sold as high as 105¼ prior to the outbreak of the war. The January, 1918, quotation on the London Stock Exchange was 91.

The municipality of Concepcion (population approximately 65,000) has outstanding an external loan, the original issue of which was for £150,000 bonds, bearing interest at 5½ per cent per annum and guaranteed as to principal and interest by the Government. The bonds, issued 1913 at par, sold at 104 prior to the war. The January, 1918, price was 94. Approximately £136,200 of the bonds remained outstanding at the close of 1917.

The city of Vina del Mar, a residential suburb of Valparaiso, noted as being one of the most beautiful cities in South America, has outstanding £186,340 of an original issue of £200,000 5 per cent bonds, which were publicly offered in 1913 by the London City & Midland Bank (Ltd.) in Great Britain at 90½. The bonds are unconditionally guaranteed by the Chilean Government as to both principal and interest. The January, 1918, price was approximately 81.

The internal bonds of the city of Santiago carry interest at 8 per cent per annum. The selling price early in 1917 was 91¼.

PRESENT SITUATION AND PROSPECTIVE REQUIREMENTS.

The Republic of Chile will require funds during the next few years for the construction of waterworks and drainage systems in various locations, for the completion of port works at Port Antonio and Valparaiso, and for the construction of ports at Antofagasta, Arica, Valdivia, Constitucion, Iquique, Talcahuano, etc. It is likewise contemplated that further railways will be constructed under State ownership and that large sections of the existing systems will be improved and additional equipment acquired. The country during the European war has handled its debt payments in a creditable manner Thus far little American capital has gone into the national obligations of Chile, despite the fact that American interests, through ownership of the Chile, Braden, and other copper properties, extensive nitrate and iron deposits, and various other undertakings, have become an important factor in the development of Chile.

FOREIGN INVESTMENTS IN CHILE.

Thanks to the stability and enterprise of the Chilean Government, large sums of foreign capital have been attracted to the field. While a very large proportion of the money has gone into nitrate and mining enterprises, considerable sums have been invested in national loans, railroads, public utilities, banks, etc. Investments have generally been successful, proportionately more successful than in most other Latin American countries. A recent estimate made by the author, from official sources, placed Great Britain's investments in this field at approximately $340,655,000. This includes a very large proportion of the foreign loans, practically all of the independent railways, a number of important nitrate oficinas, coal properties, mines, etc.

The United States, with its capitalists and investors controlling the important Chile Copper Co. and other mineral properties, would probably come second on the list of nations. The Chile Copper Co. is capitalized at about $110,000,000 United States gold, its securities selling in the market at nearly this price. The Braden Copper Co. (market value of securities in excess of $60,000,000) is American, and Americans are interested in other copper mines. The Bethlehem Steel Corporation owns immense iron ore deposits and the Duponts a valuable nitrate tract. The National City Bank of New York is located at Valparaiso and is the pioneer American bank in this field. An estimate of $225,000,000 would probably cover the capitalization of American investments in Chile.

Germany holds a fair-sized amount of Chilean bonds, and has invested about 5 per cent of the capital employed in the nitrate industry. German merchants and importers are numerous in Chile, and German capital is invested in banks and insurance companies. About 5 per cent of the fire-insurance business is handled by German companies (47 per cent by British companies). In and about Valdivia, in south-central Chile, Germans control most of the various enterprises. These include a shipyard, a sugar-refining plant, a plant for the extraction of fiber from flax, a brewery, and a number of sawmills. The public utilities in Valparaiso and Santiago are also partially under Teutonic control. Germany's total investments in Chile would probably total at least $75,000,000—possibly $100,000,000. French capital has been placed in Government loans, the iron and steel industry, a bank, and a limited number of other enterprises, while Holland and Belgium hold a number of Chilean national bonds. A Norwegian company, registered in Santiago, owns a steam fleet engaged in the whaling industry, and there is a small amount of Argentinian capital in southern Chile and Peruvian capital in Arica and Tacna.

BANKS AND BANKING.

There are at the present time no fewer than 23 banks in the Republic of Chile, including 9 foreign institutions, among which are the National City Bank of New York, the Anglo-South American, London and River Plate, Mercantile Bank of Bolivia, one French, and three German banks. The banks, generally speaking, are prosperous, and dividend returns are substantial. The German banks in past years wielded the greatest influence among the foreign institutions. The three German banks have 18 establishments throughout Chile, their business in southern sections of the Republic being particularly large. The well-known British institution, the Anglo-South American Bank, maintains 10 branches and is a factor of considerable importance in Santiago, Valparaiso, and the nitrate districts. The London & River Plate Bank has an office at Valparaiso, and the same is true of the National City Bank of New York and the Banco Italiano. The French Bank (Banco Francés), opened March 1, 1917, is at Santiago.

Largest and most important among the banks of Chile is the Banco de Chile, capitalized at 40,000,000 paper pesos ($8,800,000 United

States currency at present rate of exchange). The bank was formed in 1893 as the result of the consolidation of the Agrícola Bank, the Banco Nacional de Chile, and the Valparaiso Bank. There are branches in all the important centers. Deposits total 170,196,418 paper pesos and 23,695,957 gold pesos of 18d. Reserves as of December 31, 1916, totaled 22,000,000 gold pesos. Profits during the second half of 1916 were 3,667,531 paper pesos, and the dividend for the period (8 per cent) totaled 3,200,000 paper pesos. The 100-peso shares of the bank are quoted at approximately 205 and are listed in both Santiago and Valparaiso. Dividends have varied from 15 to 18 per cent per annum. The bank is in reality very closely allied to the Government.[1]

Probably the second bank in importance is the Banco Español de Chile, which has a capitalization of 30,000,000 paper pesos and a reserve of 12,000,000 paper pesos and 863,715 gold pesos of 18d. Deposits in March, 1917, totaled 100,691,025 paper pesos and 3,299,868 gold pesos. The profit for the six months ended December 31, 1916, amounted to 2,216,111 paper pesos and the dividend (6 per cent) to 1,800,000 paper pesos. The rate of 12 per cent per annum has been maintained for a number of years. In May, 1917, 100-peso shares were quoted at 148.

The Banco Nacional is an important institution, capitalized at 16,000,000 paper pesos and having a reserve fund of 4,000,000 paper pesos, as well as various other funds to the amount of 3,117,465 paper pesos. The profits for the six months ended December 31, 1916, amounted to 1,111,020 paper pesos. Dividend payments for the six-months period totaled 960,000 paper pesos (6 per cent). Deposits in March, 1917, totaled 30,213,312 paper pesos and 1,280,283 gold pesos of 18d. The 100-peso shares of the bank have only been paid in to the amount of 40 pesos; these shares sold April, 1917, in the market at about 50 pesos.

The bank of A. Edwards & Co., which has its principal office at Valparaiso and a branch at Santiago, has an authorized capital of 25,000,000 paper pesos, of which 10,000,000 pesos is outstanding. The stock of the institution is privately held. Deposits in March, 1917, totaled 19,515,018 paper pesos and 3,167,798 gold pesos of 18d.

The Banco Santiago, a prosperous institution located in the capital, and the usual depository for the Catholic Church and its institutions, is capitalized at 8,000,000 paper pesos and has reserves of 2,543,983 pesos. During the last half of the calendar year 1916 the bank realized a profit of 616,425 paper pesos. The dividend for the period was 7 per cent, making 14 per cent for the year, which is the usual rate. Deposits as of March 1, 1917, totaled 14,088,761 paper pesos. The 100-peso shares were worth in April, 1917, about 140.

Among the smaller banks the Banco Popular stands high in importance. Its capitalization is 1,000,000 paper pesos, on which a profit of 82,363 pesos was realized during the last half of 1916. The dividend for the six months (7 per cent) totaled 70,000 paper pesos. This institution is an old one, having been founded in 1887. Its shares were quoted in April, 1917, at 133.

The Bank of Talca and the Bank of Concepcion are important factors in the development of southern and central Chile. The former institution has deposits of 12,638,035 paper pesos and the latter of 9,452,781 paper pesos. The capitalization of these banks is 850,000 and 500,000 paper pesos, respectively.

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[1] For 1917 the net profit was 4,470,172 gold pesos. The dividend was 8 per cent on 40,000,000 gold pesos shares; dividends were also paid on installments of new shares which will increase capital to 60,000,000 gold pesos.

The Banco Curico is capitalized at 3,000,000 paper pesos and earned a profit of 236,008 pesos during the second half of 1916. The dividend was 7 per cent. Reserves totaled 1,043,238 pesos. The bank is in a very prosperous condition.

The far south of Chile (the Magallanes Territory and Tierra del Fuego) is dependent on branches of certain of the aforementioned institutions and upon the Banco de Punta Arenas, located at Punta Arenas. This latter bank has increased in size and prosperity during recent years, its capital to-day amounting to 4,000,000 paper pesos (10,000,000 pesos authorized), with reserve funds exceeding 700,000 paper pesos.

The list of local banks, as enumerated, is not by any means a complete one. Among the other institutions may be mentioned the Unión Comercial, located at Santiago; the Bank of the Republic, the two local banks in the far northern Province of Tacna (the Bank of Tacna and the Mercantile Bank of Tacna), and several other banks serving local communities.

Among the foreign banks doing business in Chile, it may be mentioned that at the present time and under present conditions the British-owned Anglo-South American Bank is the most important. Its deposits as of March 1, 1917, totaled 35,993,918 paper pesos and 27,357,866 gold pesos of 18d. The German Transatlantic Bank (Banco Alemán Transatlántico) as usual heads the list of German banks, with deposits of 21,002,620 paper pesos and 13,532,607 gold pesos of 18d. The Bank of Chile and Germany (Banco de Chile y Alemania), the other important Germanic institution, had deposits totaling 19,577,645 paper pesos and 208,410 gold pesos of 18d. The English-owned London and River Plate Bank held deposits to the amount of 4,991,922 paper pesos and 8,224,609 gold pesos of 18d. The German Bank of South America, a much smaller institution, had deposits of 1,657,591 paper pesos and 1,969,693 gold pesos. This last-named institution maintains seven branches throughout the Republic. It was founded in the year 1886 and is controlled by Hamburg capitalists, who likewise have banking interests in the Republic of Brazil.

The various national banks pay interest rates varying from 1 per cent on accounts current to 5 and 6 per cent on long-term deposits. Generally speaking, they are prosperous.

In addition to the national banks there are two very important savings institutions, handling deposits largely of the poorer classes. These two banks are known as the Caja Nacional de Ahorros and the Caja de Ahorros de Santiago. The former institution maintains 22 banks and is the larger and more important. The number of accounts and the amounts deposited February 28, 1917, were as follows:

Savings institutions.	Accounts.	Deposits, paper pesos.
Caja Nacional de Ahorros	482,043	84,899,275
Caja de Ahorros de Santiago	201,234	32,760,215
Total	683,277	117,659,490

The interest paid to depositors varies from 3 per cent on accounts current to 6 per cent on long-time accounts. These institutions play a very important part in the economic and financial development of Chile.

The Caja de Crédito Hipotecario is an institution under State supervision making loans on real estate to landowners. These loans are made after thorough appraisements and are in the form of bonds which have been issued in various series bearing interest from 6 to 8 per cent. These bonds are outstanding in series as follows:

Bonds.	Chilean paper pesos.	Francs.	Pounds sterling.
8 per cent bonds	215,176,079		
7 per cent bonds	91,694,237		
6 per cent bonds	69,057,380		623,100
5 per cent bonds	1,671,620	46,925,086	7,326
Total	377,599,316	46,925,086	630,426

Quotations during the months of February and March, 1917, for the so-called "letras de la Caja" averaged 86 for the 6 per cent, 90 for the 7 per cent, and 97 for the 8 per cent.

In addition to the Caja de Crédito Hipotecario there are three privately operated institutions of a like character. These are the Banco Hipotecario de Chile, the Banco Chilena Garantizador de Valores, and the Banco Hipotecario de Valparaiso.

The shares and bonds of these mortgage banks were quoted on the Valparaiso and Santiago Stock Exchanges in May, 1917, as follows:

Title.	Shares.		Bonds.		
	Par value.	Selling price.	8 per cent.	7 per cent.	6 per cent.
	Pesos.	*Pesos.*	*Pesos.*	*Pesos.*	*Pesos.*
Banco Hipotecario de Chile	200	543	94	89	87
Banco Chilena Garantizador de Valores	100	168	91	90	90
Banco Hipotecario de Valparaiso	100	120	98	91	85

The Banco Hipotecario de Valparaiso during the second half of 1916 earned a profit of 134,089 paper pesos. Dividend payments for the half year were 100,000 paper pesos, equal to 5 per cent on the 2,000,000 paper pesos shares outstanding. Reserves for various purposes amounted to 547,846 paper pesos.

These mortgage-bank securities are much in favor among Chilean investors, forming a very large proportion of the daily transactions on the two local Stock Exchanges. Their yield return is large and as they are well secured by mortgage on property which should advance in value once the war is over, they may be said to be attractive.

There follows a table showing the stock exchange quotations as of May, 1917, of the shares of the leading Chilean banks:

Banks.	Par.	Price.	Banks.	Par.	Price.
Banco de Chile	100	203½	Popular	100	131
Banco Español de Chile	100	151	República	100	41
Garantizador de Valores	100	[a] 168	Santiago	100	140
Hipotecario de Chile	200	[a] 543	Unión Comercial	20	8
Hipotecario de Valparaiso	100	[a] 120	Italiano	20	3
Nacional	[b] 100	50			

[a] At the close of the year 1914 the shares of the three mortgage banks under private ownership were quoted: Banco Chilena Garantizador de Valores, 115; Banco Hipotecario de Chile, 390; and Banco Hipotecario de Valparaiso, 100. During a similar period other bank shares have mostly had a corresponding advance, as for example the Banco Nacional shares, which sold below 40 at the beginning of the year 1915.

[b] Of this 100 pesos a total of 40 pesos has been paid in.

INSURANCE COMPANIES.

The insurance business in its various phases has assumed large proportions in Chile. A number of foreign companies (mostly British, with a few German) have entered the field and have secured a very large share of the business. The Government receives from the companies a tax equal to 2 per cent of the premiums received by them. As an indication of the amount of business done by the insurance companies, local and foreign, the following table is appended:

Companies.	Insurance effected from Jan. 1 to Sept. 30, 1916.	Premiums paid.
	Paper pesos.	*Paper pesos.*
National	756,542,022	8,186,550
Foreign	1,002,389,212	10,452,484
Total	1,758,931,234	18,639,034

An estimate made several years ago indicated that of the total insurance handled 48 per cent was by local companies, 47 per cent by British companies, and 5 per cent by German companies. Since this estimate was made the proportion written by foreign companies has increased, amounting during the period from January 1 to September 30, 1916, to 57 per cent of the total.

One of the important local companies is La Alianza Chilena, capitalized at 2,000,000 paper pesos. This company earned during the six months ended December 31, 1916, a profit of 414,163 pesos, of which 160,000 pesos was paid as an 8 per cent dividend and 140,000 pesos appropriated to cover the dividend of 7 per cent paid July last. Reserves of various kinds as of December 31, 1916, amounted to 1,269,952 pesos. The 25-peso shares of this company were quoted in May, 1917, at 40.

La Chilena Consolidada likewise has a capital of 2,000,000 paper pesos. Its half-year profits totaled 207,930 pesos, of which 160,000 pesos was paid as an 8 per cent semiannual dividend. Reserves amounted to 1,838,868 pesos.

La Española, one of the richest of the smaller companies, has a capitalization of 200,000 paper pesos and reserves, shareholders' funds, etc., of 2,324.914 paper pesos. Profits for the second half of 1916 totaled 192,803 pesos, of which 100,000 pesos was distributed as a dividend of 50 per cent and the balance carried to shareholders' and dividend funds. The 10-peso shares of this company sold in May, 1917, at 140.

La Francesa earned a profit of 60,448 paper pesos during the second half of 1916. A dividend of 20,000 pesos (10 per cent) was paid on the 200,000 paper pesos stock of the company. Reserves amounted to 435,583 pesos.

The Anglo-Chilena company, a new concern, has a capitalization of 500,000 paper pesos.

The Franco-Chilena company made a profit of 47,082 paper pesos during the second half of 1916. Dividend payments amounted to 40,000 paper pesos. The capitalization is 1,000,000 paper pesos.

La Italia made a profit of 73,819 paper pesos during the six months' period. Of this sum, 50,000 pesos was paid as a semiannual dividend of 10 per cent. This company's statement as of December 31, 1916, showed various reserves to the amount of 796,559 paper pesos and a capitalization of 500,000 paper pesos.

La Protectora, a small but successful company, earned during the period 65,156 pesos on the 100,000 pesos stock outstanding. The dividend for the period was 60 per cent, a further indication of prosperity. The 25-peso stock of this company sold in the market in May, 1917, at 300 pesos per share. Reserves as of December 31, 1916, totaled 950,533 pesos.

La Previsora's profits were 30,070 pesos, which was credited to various funds. The capitalization is 200,000 pesos and reserves total 227,008 pesos.

Among the various other companies operating in the field the following may be mentioned:

(1) La Alemana, which has a capitalization of 2,000,000 pesos, of which 300,000 pesos has been paid in. Reserves and funds amount to 559,373 pesos.

(2) La Comercial, founded in 1899.

(3) La República, with a paid-in capital of 500,000 pesos.

(4) La Nacional, with a paid-in capital of 200,000 pesos and reserves to the amount of 2,323,914 pesos. This company, the 25-peso shares of which sell at 550 pesos (May, 1917), has paid 1,520,000 pesos in dividends since beginning business January 1, 1899.

(5) La Mundial (the "World"), with a capital of 2,000,000 pesos.

Most of the companies handle a general business—fire, life, accident, etc.

As an indication of the prosperity of the various Chilean insurance companies, the following table is appended, showing par value and market value of the shares of the various companies:

Companies.	Par value of stocks.	Market price May, 1917.	Companies.	Par value of stocks.	Market price May, 1917.
	Paper pesos.	*Paper pesos.*		*Paper pesos.*	*Paper pesos.*
La Alemana	75	200	La Franco-Chilena	20	25
La Alianza Chilena	25	40	La Germania	25	25
La America	25	62	La Iberia	57½	55
La Americana	50	95	La Internacional	25	92
La Araucania	25	25	La Italia	100	213
La Central	25	35	La Nacional	25	555
La Comercial	50	125	La Nueva España	75	90
La Chilena Consolidada	25	49	La Protectora	25	300
La Española	10	140	La Santiago	50	163
La Francesa	50	110	La Unión Chilena	50	530

RAILWAY DEVELOPMENT.

Chile has, during recent years, developed a large railway mileage. Railways extend from near Iquique, 20° south, to Puerto Montt, 42° south, forming an artery through the central sections of the Republic; while from almost every port and seacoast town lines radiate inland, either to connect with the railways running north and south or to reach some important center of mining or agricultural wealth. The Republic contains the termini of three international lines, two extending into Bolivia and one into Argentina. Future plans call for the construction of additional lines to Argentina, as well as the construction of new local lines and the extension of existing railways. As of December 31, 1916, the total mileage of railways in operation in Chile was 6,014 (9,678 kilometers). On the date mentioned, 148 miles (237 kilometers) of new lines were under construction. A considerable additional mileage is contemplated. The gauges of the existing railways vary from 2 feet 6 inches, used by the Antofagasta & Bolivia Railway, to 5 feet 6 inches, used by the State Railways in central Chile. There are in all six different gauges in use. A very large proportion of the railway mileage is under State control.

Chile was first placed on the railway map in 1849, in which year William Wheelwright, an American, founder of the Pacific Steam Navigation Co., completed the construction of a line from the port of Caldera to the mining town of Copiapo. This is the oldest existing line in Latin America and, with the exception of the Demarara Railway in British Guiana, is the oldest line in South America.

A short time after the completion of the Caldera-Copiapo line, Wheelwright, together with another American, Allen Campbell, surveyed the existing Government line between Valparaiso and Santiago. A few years later construction work was begun by S. W. Greene, of Rhode Island. The line was finally completed in the year 1863 by Henry Meiggs, of the United States, famous as the builder of the Central Railway of Peru. It is said that when Meiggs took over the contract to complete the road (this was late in 1861) it was stipulated that the line must be completed in three years. A fine of $10,000 per month was to be paid by Meiggs for each month's delay in the completion of the railway, and he was to receive $10,000 for each month gained in carrying out the contract. So fast did Meiggs push the construction of the railway that more than a year was gained. The cost of this line was, it is stated, $11,300,000 United States currency.

Chile for many years has favored State ownership of railways and has acquired or constructed a large mileage. As of December 31, 1915, these railway properties were valued by the Government as follows:

Railways.	Paper pesos	Gold pesos of 18d.
State Railways	32,194,946	228,105,405
Arica-La Paz Railway	73,853,188	
Total	106,048,134	228,105,405

CENTRAL RAILWAY.

The distance from Valparaiso to Santiago by the Central (State) Railway is approximately 125 miles. The gauge of the line is 5 feet 6 inches and the highest station, Las Chilcas, 2,051 feet. Trains carrying American parlor cars make the run in four hours. South from Santiago the railway follows the rich Central Valley, the altitude of this section varying from 100 to 1,700 feet. Fast express trains are maintained between Santiago, Talca, Concepcion, and Talcahuano, while through trains run to Valdivia and Puerto Montt. All this section of the railways does a large freight and passenger business. There are a number of important branches on the line, including (1) a line from Santiago to Port Antonio, which will greatly increase in value following the completion of the port works at the latter place; (2) the Los Andes branch, which connects with the Chilean Transandine Railway, a portion of the through route to Buenos Aires; (3) the Calera to Cabilda branch, which joins the terminus of the Longitudinal (State) line at the latter place; also branches to Talcahuano, Constitucion, Carahue, Valdivia, etc.

LONGITUDINAL RAILWAY.

The Longitudinal Railway, which operates or is constructing the State lines northward from Cabilda, is, unlike the Central Railway, of meter gauge. This railway, which is eventually to be carried northward as far as Arica, was constructed primarily for strategic reasons and, secondarily, to develop certain important sections of country and connect various cities and towns in the interior. As it stands to-day the Longitudinal Railway does not handle a very extensive traffic, particularly in its more northerly sections. A weekly train service is maintained between Antofagasta (Antofagasta & Bolivia Railway to Aguas Blancas) and Santiago. Two changes of cars are necessary, and the running time is about three and one-half days. The numerous steamers plying along the coast are very serious competitors for through traffic, and the Longitudinal line is very badly in need of additional equipment. The "cabotaje" trade or coastal commerce of Chile during 1915 amounted to 275,011,704 paper pesos.

As of December 31, 1915, the Government of Chile had guaranteed £7,081,750 bonds issued to construct the Longitudinal lines. These were divided as follows: North Longitudinal Railway, £3,055,750; South Longitudinal Railway, £4,026,000. The northern section of the line was constructed by the Chilean Northern Railway for the Government, the bonds being issued and publicly offered for subscription in London, with, as stated, the interest (5 per cent) and sinking fund guaranteed by the Chilean Government. The January, 1918, price for the bonds was 86. The North Longitudinal Railway (Chilean Northern Railway) operates that section of the Longitudinal line located north of Copiapo, while the southerly section, Copiapo to Cabildo, is operated by the South Longitudinal Railway.

The £4,026,000 South Longitudinal bonds were issued by the Government in three series, dated 1910, 1913, and 1914. Bonds outstanding under these three series amount to £1,073,088, £1,099,945, and £1,634,175, respectively, and the average market price for the loan in London January, 1918, was 87–90. The bonds under series "B" issued in 1913 by J. Henry Schroeder & Co., of London, were publicly offered at 96. They bear interest at 5 per cent per annum and are retirable by a sinking fund, cumulative, of 2 per cent per annum.

On the southern section of the railway some very heavy grades are encountered, necessitating the use of the Abt rack system. Approximately 28 miles of this rack system are in use, the maximum gradient being 6 per cent on the rack line and 3 per cent on the ordinary section. There are rather long tunnels en route, and portions of the line are located in sections where railway construction was difficult. The Chilean Northern Railway section of the system extends northward from Copiapo to Pintados, the latter point being located southeast of Iquique. Here connections are afforded with the Nitrate Railways to Iquique and Pisagua. A line into Iquique, to be operated by the Longitudinal Railway, is under construction. Lines to connect the main stem of the railway with Antofagasta and Mejillones have been approved by the Government. These lines have been located and will probably be constructed in the immediate future. The extension of the main line to Arica is expected to be built northward from Zapiga, a station on the Nitrate Railways, which railway directly connects with the existing Longitudinal line at Pintados; this, however, will probably not be constructed in the immediate future, owing to lack of funds. This section of the line will be about 175 miles (278 kilometers) in length and will not produce a great amount of local traffic. Connections will be afforded with the Arica-La Paz Railway to Bolivia, and the Arica & Tacna Railway at Arica, which will mean that the nation will have direct railway connections between Tacna, which is practically on the border with Peru, on the north and Puerto Montt on the south.

FINANCES AND OPERATING RESULTS OF GOVERNMENT RAILWAYS.

The railways acquired by the Government and consolidated into the State system earned during the years 1855 to 1884 (in which latter year the consolidation was effected) 67,362,244 paper pesos gross and 27,117,230 pesos net, the ratio of operating expenses to gross earnings being approximately 60 per cent. In 1884, the first year of the State Railways, gross receipts totaled 6,000,000 paper pesos and net receipts 2,858,757 pesos. Slightly less than 600 miles of line were operated. During the 10-year period 1885 to 1894, a profit was consistently shown, the net receipts during this period exceeding 16,600,000 paper pesos. In 1885, for the first time in the history of the State Railways, a deficit (455,255 paper pesos) resulted. The mileage at that time was about 820. In 1896 there was a deficit of 164,711 paper pesos. Gross earnings for that year totaled 13,126,273 paper pesos. During the period 1897 to 1906 expenses were, on the average, about equal to revenues. In the latter year approximately 1,543 miles of line were operated, and gross receipts had reached the total of 24,800,000 paper pesos. In 1907 a deficit of 20,506,407 paper pesos resulted, and during the years 1908 to 1913 the deficits averaged between 10,000,000 and 21,000,000 paper pesos. Recently conditions have improved considerably, and it is stated that profits have been earned for the year 1916 to the amount of 8,000,000 paper pesos. Further data concerning the operating results of the various State lines will be furnished in a later paragraph.

In addition to the Central Railway and the North and South Longitudinal Railways, the State operates several lines, among them the Coquimbo, Copiapo, Huasco, Chanaral, and Arica-La Paz Railways.

CALDERA-COPIAPO LINE.

The Caldera to Copiapo line, the oldest railway in Chile, runs from the port of Caldera, 47 miles south of Chanaral, to Copiapo and San Antonio (about 100 miles), with about 75 miles of branches. The Longitudinal Railway is joined at Toledo. An extension of this line through the Andes to Argentina has been discussed for half a century or more. Formerly this railway was quite profitable, but during recent years operating expenses have shown a steady advance. Copper is the principal commodity handled, this being shipped from Caldera. The port is a good one, being fairly well sheltered, and the town handles a considerable amount of business. Copiapo is likewise an important, up-to-date city. The gas works located there were established by William Wheelwright, the American pioneer of railway development in South America.

COQUIMBO RAILWAY.

The Coquimbo Railway was acquired by the Government in sections. The portion of the railway from Trapiche to Tongoi was constructed by the North American Syndicate and cost £203,371. In 1899 a mortagage covering this property was foreclosed and in 1901 the Government acquired the line for £19,250, the amount of the mortgage. In 1896 the Coquimbo Railway proper was acquired from an English company for £245,000, and £20,000 additional was expended to acquire other mileage. The Government issued £265,000 4½ per cent bonds to provide funds for the cost of the undertaking, and such of these as remain outstanding are included in the indebtedness of the Republic. A large portion of this railway was originally of 5-foot 6-inch gauge; this, however, has been changed to meter gauge, partly by means of a third rail. The section of the railway to Rivadavia was purchased in 1895 for £200,000. A part of the mileage of the Coquimbo Railway is now included in the Longitudinal line. Coquimbo, the main port of this railway, is situated about 200 miles north of Valparaiso. It has nearly 25,000 inhabitants and is of considerable importance. The iron mines owned by the Bethlehem Steel Corporation are located no great distance from the city. Serena, an important town on this line, has a population of more than 20,000. Although within a mile of the sea, it is not a port; it is, however, capital of the Province of Coquimbo.

HUASCO RAILWAY.

The Huasco Railway, a short line, links the port of Huasco with Vollenar, the junction with the Longitudinal Railway. This railway is about 31 miles in length and is of meter gauge. Huasco, the port, is 165 miles south of Caldera, and is located on a bay that has shelter from the south and west. Minerals, hay, hides, and live stock are the chief exports, a large coastal trade being handled. Vollenar, the eastern terminal and junction, is located in an irrigated valley in which large amounts of fruit are raised. The Huasco Railway's operations annually result in a small profit.

ARICA-LA PAZ RAILWAY.

The Arica & La Paz Railway, which extends from the Chilean port of Arica over the Andes to La Paz, Bolivia, was the result of a treaty signed by Chile and Bolivia, which stipulated that Chile should construct the road, the Bolivian section to be acquired by the latter Government 14 years after the line had been opened for traffic. Thus Bolivia will acquire its portion of the line in the year 1926.

Of the 248 miles of line between Arica and La Paz, 129 miles are located in Chile. The entire line cost more than $15,000,000 to construct and is by far the shortest of the three lines between La Paz and the Pacific Ocean. The line strikes off in a northeasterly direction from Arica, paralleling the Arica & Tacna Railway (which see) for a few miles, and soon begins its climb, through a barren, waterless waste, toward the top of the Andes. So rugged is the country traversed that the engineers when surveying the line were frequently compelled to blast a trail out of the solid rock in order to advance up the mountain side. The temperature would sometimes register below zero, Fahrenheit, in the early morning hours and would advance to 100° at noon. Engineering difficulties were encountered on every side. Six tunnels had to be bored and upward of 5,500,000 cubic yards of earthworks used. Along one section of the line the rise is sufficiently great to compel the use of 28 miles of rack rail, the longest continuous stretch of the rack system in the world. The railway crosses the divide at an altitude of approximately 14,000 feet, the highest point being located near Laguna Blanca, Chile.

The railway maintains a semiweekly passenger-train service between Arica and La Paz. The system is, however, almost completely demoralized owing to the insufficient equipment. There are not more than two locomotives in service capable of handling trains over the rack section. Port facilities at Arica are at present inadequate. The Corocoro mines in Bolivia have been unable to find means to transport their ore, and international freight service has been almost suspended. Forty days is allowed by the Chilean Government for the delivery to Bolivia without customs duties of freight shipped from foreign countries into Bolivia. This period frequently elapses before this freight can be handled and innumerable difficulties result. The railway is starving in the midst of plenty, and the Chilean Government, realizing this fact, is taking steps for the relief of the property. The line may possibly be electrified; it will, at least, be completely rehabilitated.

EARNINGS AND EXPENDITURES OF GOVERNMENT LINES.

As stated in a previous paragraph, the net earnings of the Government railways have shown improvement during the past two or three years. A comparison of gross earnings and expenditures during the period from 1913 to 1916, inclusive, is here shown:

Years	Gross earnings.	Expenditures.
	Paper pesos.	*Paper pesos.*
1913	67,989.348	80,211.299
1914	60,234,714	75,321,188
1915	73,720,401	63,721,848
1916	74,125,187	66,232,690

For the period January 1 to March 31, 1917, gross earnings totaled 19,784,813 paper pesos as compared with operating expenses to the amount of 14,804,664 pesos.

RAILWAY STATISTICS.

Statistics follow for the year 1913 of the capital employed, length, amount of equipment and traffic of the various railways of Chile, State and privately owned. The statistics are for a year during which operations of lines other than the Longitudinal and Arica-La Paz were carried on under normal conditions. The Longitudinal lines were not fully completed and the Arica-La Paz Railway had just been placed in operation, so their figures in this table can not be taken as an indication of earning capacity:

Railways.	Capital.	Earnings.	Expenses.	Equipment in service.			Passengers carried.	Freight carried.
				Locomotives.	Passenger cars.	Freight cars.		
	Gold pesos.	*Gold pesos.*	*Gold pesos.*					*Tons.*
Arica-La Paz	44,555,000	345,285	1,053,855	18	14	128	9,825	18,594
Longitudinal	94,423,333	663,187	1,800,000	75	105	742	57,000	60,500
Northern Lines (isolated)[a]	10,837,891	1,899,628	2,249,125	81	73	1,004	586,399	492,373
Central (State)	258,383,484	37,034,052	42,475,128	582	540	6,304	12,291,154	4,795,880
Line Chillan to Pinto, etc.	805,280	64,000	73,000	2	6	28	80,204	10,938
Chiloe Island Railway System	2,176 164	13,594	54,385	5	2	4	1,130	1,608
Privately operated railways	252,733,128	38,812,037	22,232,630	690	246	9,791	1,896,312	15,230,783
Total	663,914,280	78,831,783	70,039,123	1,453	986	18,001	14,926,424	20,610,676

[a] Coquimbo Railway, Huasco Railway, etc

A total of 31,323 persons were in the service of the railways of Chile on December 31, 1913. Of these, 25,323 were employed on the Government lines.

The Government's line on the island of Chiloe is of 0.60-meter gauge and extends from Ancud, the northerly port of the island, to Castro (60 miles). The island is richly timbered and fertile. Manufactures have developed to some extent. There are approximately 67 industrial establishments, including two breweries, three tanneries, seven sawmills, and three other mills. Ancud has a population of 3,546 and is in direct steamer communication with Puerto Montt on the mainland. Small coastal steamers also make the port.

ARICA & TACNA RAILWAY.

Practically all of the privately owned lines in Chile are under British control and management, and nearly all of them have been more or less successful. The most northerly of these lines is the Arica & Tacna Railway, extending from Arica, the port, to Tacna (population 11,759), capital of the Province of Tacna. This railway (British) is about 40 miles in length, was opened in 1875 under a charter given by the Republic of Peru, and cost to construct about $2,200,000 United States currency. The authorized capital is

£500,000, of which £450,000 stock, par £20, is outstanding. Nominal dividends (1½ per cent each in 1916 and 1917) are regularly paid, the stock selling (January, 1918) at approximately £3 and £4. It was originally expected that this line would sooner or later be extended to La Paz. The construction of the Arica-La Paz Railway has, however, put an end to these anticipations. The Province has about 45,000 inhabitants, 111 industrial establishments, and 521 mines.

NITRATE RAILWAYS CO.

In the Province of Tarapaca, to the south of Tacna, is located the important system operated by the Nitrate Railways Co. (British), which connects extensive nitrate fields with the ports of Iquique and Pisagua. The line was opened in 1869 as a small local line, but has since been extended, the total mileage December 31, 1917, being 390. The gauge is 4 feet 8½ inches. A total of 73 locomotives, 53 passenger-train cars, and 1,794 freight cars were in service December 31, 1915. During the year 1915, 279,054 passengers were carried and 12,839,370 quintals of freight, the latter figure comparing with 18,158,312 quintals in 1914 and 24,023,490 quintals in 1913. In 1916 and 1917 traffic was larger.

There follows a table indicating the earnings and profits of the railway for the calendar years 1913 to 1917, inclusive. Figures for 1917 are partly estimated and, although the dividend rate is stated below to be 7 per cent, no final action had been taken up to January, 1918, as to the amount to be paid to shareholders from 1917 earnings:

Items.	1913	1914	1915	1916	1917[a]
Rate of exchange	$9\frac{11}{16}$d.	$9\frac{3}{32}$d.	$8\frac{7}{32}$d.	$9\frac{5}{16}$d.	....
Gross earnings	£724,049	£559,569	£394,787	£704,026	£800,000
Expenses	351,220	296,331	195,431	351,739	428,000
Ratio	(48.50)	(52.96)	(49.50)	(49.96)	(53.50)
Net earnings	372,829	263,238	199,356	352,287	372,000
Miscellaneous income	4,914	2,807	4,928	9,807	10,000
Net income	377,743	266,045	204,284	362,094	382,000
5 per cent mortgage bonds:					
Interest	28,442	17,165	13,347	9,101	4,000
Sinking fund	207,523	159,982	58,790	121,815	79,000
Miscellaneous charges	12,319	22,672	40,772	43,201	49,000
Total charges	248,284	199,819	112,909	174,117	132,000
Net profit	129,459	66,226	91,375	187,977	[b] 250,000
Expenditure on buildings, sidings, etc	11,478	8,664	1,776	4,749	5,000
Profit for ordinary	117,981	57,562	89,599	183,228	245,000
Ordinary dividend	124,200	41,400	82,800	115,920	115,000
Rate, per cent	(7½)	(2½)	(5)	(7)	(7)
Balance	Dr. 6,219	Cr. 16,162	Cr. 6,799	Cr. 67,308	130,000
Renewal of rolling stock account	30,000	....	....	30,000	....
Balance	Dr. 36,219	Cr. 16,162	Cr. 6,799	Cr. 37,308	....
Brought forward	79,998	43,759	59,921	66,720	104,000
Carried forward	43,759	59,921	66,720	104,028	....

[a] Estimated.
[b] Equal to a dividend of over 15 per cent on the shares.

The quotations for the securities of the company (London Stock Exchange) are indicated as follows:

Securities.	Amount outstanding.	Par value.	High price since 1911.	Price January. 1918.
Ordinary shares	£1,485,340	£10	15¼	13⅜
Preferred converted ordinary	170,660	10	12¼	9¼
Deferred converted ordinary	170,660	10	5	5

The dividend annually paid by the company is on the entire stock capitalization, the ordinary shares receiving their full proportion of the dividend declared, the preferred converted up to 7 per cent, and the deferred converted the difference between the 7 per cent dividend paid on the preferred converted and the dividend paid on the ordinary, in the event that the ordinary dividend exceeds 7 per cent. No dividend was paid on the deferred converted shares in 1915, 1916, or 1917. In 1914, one-half per cent was paid. The ordinary shares are convertible into the two other classes of stock in the proportion of 100 per cent of each; likewise, a holder of one share of each class of converted stock may exchange it for one share of ordinary stock.

Formerly this company had outstanding an issue of 5 per cent first-mortgage bonds. These were originally offered in 1888 to the amount of £2,000,000, but have been wholly retired (last bonds paid off in 1917) through the operations of a sinking fund.

The Nitrate Railways Co. originally obtained its charter from the Peruvian Government. The concessions of the company expire in 1936, 1957, and 1974, when the various lines revert to the Chilean Government, the territory served being now wholly under the latter's control. The company has accumulated considerable reserves and is in excellent financial condition. It is one of the two great nitrate-carrying lines of Chile, and although its traffic is mostly made up of that single product, future prospects may be said to be very good.

The company's shares carry voting power as follows: Ordinary shares, one vote; preferred converted, one-third vote; and deferred converted, two-thirds vote per share.

ANGLO-CHILEAN NITRATE & RAILWAY CO.—AGUA SANTA RAILWAY.

In this district there are two other railways of considerable importance—the Anglo-Chilean Nitrate & Railway Co.'s line and the Agua Santa Railway. The former railway carries nitrate to the port of Tocopilla. This property usually pays 25 per cent and upward per annum (30 per cent in 1917) on the £550,000 ordinary and £350,000 preference shares and 4½ per cent on the £347,300 mortgage bonds. The Agua Santa line, owned by the Agua Santa Nitrate & Railway Co., is largely a local enterprise, although there is some British capital interested. Large dividends are paid.

ANTOFAGASTA & BOLIVIA RAILWAY.

The Antofagasta (Chile) & Bolivia Railway, a large and important British-owned line, terminates at the ports of Antofagasta and Mejillones. This is the largest and most important privately owned railway in Chile, and its career has been a most successful one. The railway (exclusive of the Bolivia Railway, which is leased) operates 820 miles of main track, 518 miles of which are located in Chile. The capitalization of this international enterprise, as of December 31, 1917, was £10,100,000, of which £6,000,000 was stock and £4,100,000 debentures. Including the Bolivia Railway (leased, as stated) and the Aguas Blancas Railway, the stock of which is owned, approximately 1,250 miles of railway are under the company's control. The Chilean section is at present of 2-foot 6-inch gauge, despite which fact trains are operated at a good speed and with comfort to travelers. A double weekly train service is maintained between Antofagasta and La Paz, the running time being approximately 1¾ days. Additional local trains are also run. The railway's climb begins almost as soon as it leaves the Pacific, the first 20 miles averaging nearly 100 feet rise to the mile. The railway crosses the Longitudinal System at kilometer 96, and some traffic is interchanged. After leaving this crossing the line enters the nitrate belt, through which it extends for upward of 30 miles. This is the principal source of traffic to the company.

At Calama, 148 miles from Antofagasta, the copper belt is reached. Not far beyond this point, on a short branch, are the Chuquicamata copper mines owned by the Chile Copper Co., an American corporation. This company holds a franchise to build a railway to the port of Mejillones, but, because of the satisfactory traffic arrangements made with the Antofagasta & Bolivia Railway, this railway will probably not be built at present. The Antofagasta & Bolivia Railway, after leaving Calama, continues to climb into rugged country. At Conchi—kilometer 300, altitude 10,000 feet—is the Loa Viaduct, 336 feet high and supported by six girder spans of 80 feet each in the clear supported on steel trestle towers. At San Pedro, a short distance farther on, are situated the waterworks owned by the railway company, which supplies the city of Antofagasta and the nitrate fields with water. This system cost upward of £1,250,000 to complete. The capacity of the water supply is estimated at 6,000 tons daily. At kilometer 362 the altitude is 13,000 feet, the highest point on the main line. From this point it drops to Cebollar, altitude 12,200 feet (kilometer 389), which is the station for the Ascotan lake of borax, worked by the Borax Consolidated Co. The lake is 24 miles in length, and the borax supply, which may be considered practically inexhaustible, is the largest in the world.

Ollague, the frontier town for Chile, is located near Mt. Ollague, a volcano, exceeding 20,000 feet in height. Some sulphur is mined at the Buena Ventura mine near here, bringing a fair amount of traffic to the railway, and from the station a branch runs to the Collahuasi copper district 60 miles away. This branch climbs to the altitude of 15,809 feet, the second highest point reached by the line (the Potosi branch in Bolivia is 15,814 feet high), and will probably develop a considerable traffic from these rich mines. The frontier line is 275 miles from Antofagasta, and from that point the railway proceeds to Uyuni, Oruro, and La Paz, with branches to Potosi and Cochabamba.

Owing to the fact that the 1916 statistics of the company were not available, the figures for 1915 are here presented. The year's business was far below normal, not comparing favorably with earnings for either 1913 or 1916. Gross results since 1912 have been as follows:

Years.	Miles operated.	Gross results.	Years.	Miles operated.	Gross results
1912	769	£1,663,935	1915	820	£1,322,056
1913	795	1,811,775	1916	838	1,844,235
1914	820	1,541,995	1917	838	2,236,925

The Chilean section (518 miles) earned in 1915 £1,036,025, as compared with £1,149,568 in 1914. These earnings were far below the results for 1916 and 1917. Net earnings amounted to £492,096 in 1915 and £486,102 in 1914. A total of 367,280 passengers were carried in Chile during 1915, as compared with 447,389 in 1914. The freight tonnage for the section in 1915 amounted to 1,439,990, as compared with 1,457,366 in 1914. The nitrate tonnage was 814,955, of which 459,838 tons went to Antofagasta and 372,129 tons to Mejillones. The copper-ore tonnage was 51,497, an increase of 3,391 tons over 1914. The Chile Copper Co.'s production is increasing, and the earnings from the copper tonnage will probably be much greater in future years. The remainder of the traffic of the railway is made up mostly of ores, etc., from Bolivia and of petroleum, coal, and imported merchandise. The earnings from the waterworks for 1915 were £101,475 gross (£111,068 in 1914) and £79,731 net.

The dividend record of the company, over a period of 10 years, has been as follows:

Securities.	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	10-year average.
	P. ct.	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*
5 per cent cumulative preference	5	5	5	5	5	5	5	5	5	5	5
Preferred ordinary [a]	......	......	5	5	5	6	5	5	5	[b] 7	5.6
Deferred ordinary	7½	7½	7½	8	8½	11	8	8	8	[b] 12	8.6

[a] Entitled to 5 per cent dividends in preference to the deferred ordinary stock and ranking equal with the latter class in all dividend payments in excess of 10 per cent per annum.

[b] Includes 2 per cent in deferred ordinary stock paid June, 1918.

During 1916 this railway effected a short-term 6 per cent loan in the United States. These notes were paid off at maturity, July 1, 1918. Its securities may be said to be sound, stable investments. Its shares sell at a high price, and the company's dividend record is an excellent one.

AGUAS BLANCAS RAILWAY.

The Aguas Blancas Railway, which, as has been mentioned, is controlled by the Antofagasta & Bolivia Railway, runs from the port of Calata Coloso, 6 miles south of Antofagasta, to various nitrate properties at or near Yungay, Aguas Blancas, Avanzada, Castilla, etc. The railway parallels the Antofagasta & Bolivia Railway for a short distance and then strikes off in a more southerly direction. The line has been moderately successful. Its £900,000 4½ per cent bonds are listed on the London Stock Exchange and bear the guaranty of the Antofagasta & Bolivia Railway.

TALTAL RAILWAY.

The Taltal Railway, an important line, is the next privately owned system to the south of Antofagasta. The corporation is English. The railway extends from Taltal, a major port located on a bay about 110 miles to the south of Morena Bay (Antofagasta), in an easterly direction to Canchas (25 miles); from this point a branch runs northward to Puertazuela and Santa Luisa, where are located important nitrate oficinas (length of branch 26 miles). From Canchas the railway runs in a northeasterly direction, crossing the Longitudinal Railway near the Alianza nitrate oficina and continuing to Aguado and Cochinal, approximately 95 miles from Taltal. An important branch extends from Ovalo to Salintas, the latter an important nitrate center. There are also several additional short branches, the total length of the railway system being 184 miles. The maximum gradient of the line is 4.8 per cent and the average gradient about 2 per cent. Nitrate is the principal source of traffic, although a fair passenger and general freight business is handled. Daily passenger service is maintained over most of the line. Most of the locomotives in service burn oil as fuel.

The capitalization of the Taltal Railway consists of 900,000 shares, par £5, and £229,000 first-charge 4½ per cent debentures, these securities being listed on the London Stock Exchange (see Appendix). Dividends during recent years have averaged from 6 to 9 per cent per annum.

The port of Taltal, as of December 31, 1916, had an estimated population of 16,277. Facilities at the port are fairly good and the town is a modern one, lighted by electricity and containing a number of important business houses. The Province of Taltal is said to contain considerable undeveloped areas of nitrate lands, gold, silver, and copper ores, and other mineral deposits. Steamers of the Pacific Steam Navigation Co., the Chilean Line, etc., make the port with fair regularity.

MINERAL RAILWAY FROM ALGARROBO MINES TO CALDERA.

There is a short mineral railway owned by the Comunidad Minera de la Viuda, which runs from the Algarrobo mines to the port of Caldera (see description of Copiapo Railway, under Government lines). This line is slightly more than 25 miles in length and is not important as a common carrier. The general direction followed by the line is northeasterly.

CARRIZAL & CERRO BLANCO RAILWAY.

Another important privately owned railway is the Carrizal & Cerro Blanco line. This railway extends from Carrizal Bajo, a minor port, located 73 miles south of Caldera and 92 miles north of Huasco, inland to Yerba Buena (60 miles), with several branches to important mining centers. Most of the company's business is derived from mineral traffic, although there is sufficient passenger traffic to warrant daily service. The total mileage is about 125.

The company has outstanding 1,500,000 paper pesos capital stock of a par value of 500 paper pesos, of which 2,619 shares were held in England at latest accounts and the remainder, 381 shares, in

Chile. Receipts and expenditures during recent years have been as follows:

Periods.	Receipts.	Expenditures.	Net earnings.
	Paper pesos.	*Paper pesos.*	*Paper pesos.*
July-December, 1913	216,909	146,453	70,456
January-June, 1914	193,006	141,945	51,061
July-December, 1914	182,702	124,339	58,363
January-June, 1915	131,661	137,882	−6,221

On various occasions this company has paid moderate dividends to its stockholders. The line is an old one, about 23 miles having been constructed prior to 1864.

CHILEAN TRANSANDINE RAILWAY.

Best known and least successful among the privately operated lines in the Republic is the Chilean Transandine Railway, forming a portion of the only transcontinental line south of the Isthmus of Panama. The Chilean Transandine Railway starts at Los Andes, the western terminus of a branch of the Central of Chile (State) Railway, forming a 43-mile link in the 886-mile system from ocean to ocean.

Los Andes, the terminal, is 88 miles from Valparaiso, and here the passengers and freight must change cars owing to the fact that the State line is of 5-foot 6-inch gauge and the Transandine Railway of meter gauge. The altitude here is 2,723 feet. There is a 43-mile trip before the line enters the heart of the mountains to emerge on the Argentine slope. It is a wild and wonderful country through which this railway has been constructed. Cliffs, crags, and deep gorges abound, while there are 25 tunnels and 118 bridges, all across one stream or its tributaries. Twenty miles of rack rail are used, while snow and avalanche sheds are frequently necessary, inasmuch as the railway has to contend with mighty storms that occur with considerable frequency during the winter months, blockades often lasting several months. During the winter of 1916 the line was kept open continuously for the first time in the railway's history. The maximum grade of the line is 8 per cent.

The cost of the Chilean Transandine Railway has far exceeded expectations, property and equipment being carried on the books as of June 30, 1915 (figures published June, 1916) at £3,001.670. The company had outstanding on that date £1,400,000 preference shares, £100,000 ordinary shares, and £1,485.000 5 per cent debentures guaranteed for 20 years from 1903 by the Chilean Government. Thus the capitalization of this line amounts to upward of $317.000 United States currency per mile (exchange figured at par). Earnings of the line for 1914–15 totaled £23.607 (approximately $2,000 per mile), and there was an operating deficit of £29,066. Interest requirements amounted to £75,000, which sum was advanced by the Government. Freight earnings are very small, most of the business being derived from the operation of the semiweekly international passenger train. Further references to the railway and the 2-mile international tunnel are made in the chapter on Argentina (see p. 53).

RAILWAY OPERATED BY ARAUCO CO.

The only other important privately owned railway in Chile is that operated by the Arauco Co., an English concern operating important coal properties located to the south of Concepcion. The line handles about 250,000 tons of coal annually and also does a general freight and passenger business, which averages £15,000 to £20,000 annually. About 62 miles of main line and branches and additional mileage of coal-mining spurs are operated. The railway crosses the River Bio Bio via a bridge approximately 1¼ miles in length, the longest bridge in South America. Four daily passenger trains are operated daily in each direction, running between Concepcion, Coronel, Lota, and points beyond.

The capitalization of the company consists of £478,000 stock, on which 8 per cent and upward is paid each year; also £481,000 debentures and £75,000 5 per cent income bonds. The shares generally sell at a fair premium on the London Stock Exchange and are in favor with investors.

SMALL PRIVATELY OWNED RAILWAYS—TRANSANDINE PROJECTS.

There are no other important privately owned railways in Chile. From Rancagua, 87 kilometers (54 miles) south of Santiago, the Braden Copper Co. has constructed a line some 70 kilometers (44 miles) in length to its mines. From Collilelfu, east of Puerto Montt, the San Martin Railway, a proposed transandine line, runs to Huidif, 30 kilometers (18.6 miles). From the latter point this company operates a road transportation service to Rinahue on Lake Rinahue, 10 kilometers (6.2 miles), from which landing a steamer runs to Chosuenco, 31 kilometers (19.3 miles). The remainder of the 161-kilometer (100-mile) trip to San Martin is made 43 kilometers (26.7 miles) by road and 49 kilometers (30.4 miles) by steamer. San Martin is on Lake Lacar, Argentina. All of this service, which is maintained weekly, is operated by the railway company. The company originally intended, and still hopes, to continue its line through to connect with the Argentine State Railways running to the Atlantic Ocean. A considerable amount of rough country must be traversed before railheads are connected.

There have been put forward no fewer than 15 transandine projects, the majority of these to be located south of the existing line. One of these would involve an extension of the Chilean Eastern Central Railway (which is only partly completed) from the port of Lebu through the coal fields to join the State Railway. The State line would be used from Los Sauces to Curacautin (73 miles) and an extension built through the Lonquimay Pass to join the Neuquen extension of the Buenos Aires Great Southern Railway. The cost of the line is estimated at $15,000,000.

Among the small privately owned railways is the line running from Punta Arenas to the Loreta coal mines, worthy of note only because it is the most southerly railway in the world. It is of 2-foot 6-inch gauge.

SUMMARY OF RAILWAY SITUATION.

As will be seen from the foregoing account, Chile is excellently provided with railways. The important Central System, owned by the

State, is, of course, the largest of these lines. The Longitudinal Railway has been constructed ahead of its time and is largely important as a strategical system. With the acquisition of much-needed equipment traffic will increase, and the inflow of population that will probably come to Chile in the not distant future will materially help the line. Lack of cars in service and of certain needed improvements makes it impossible to compete successfully with the numerous coastwise steamers that make the various ports, and therefore large deficits usually result.

Private railway ventures, other than the Chilean Transandine Railway, have returned very substantial profits on sums invested. Chile's railway situation may be said to be excellent. Its present mileage is large and will further increase during the next few years.

RAILWAY CAPITALIZATION AND QUOTATIONS FOR SECURITIES.

The following table indicates the capitalization, par value of shares, and quotations for securities of the most important privately operated railways in Chile:

Names of companies and classes of securities.	Amount outstanding.	Par value.	High price since 1911.	Price, January, 1918.
Antofagasta & Bolivia Railway:				
Preferred ordinary stock, 5 per cent	£2,000,000	£100	112	85
Deferred ordinary stock	2,000,000	100	174	133
5 per cent cumulative preference stock	2,000,000	100	110	80
4 per cent perpetual debenture stock	1,000,000	100	104	70
4½ per cent debenture stock, redeemable	1,000,000	100	109	81
5 per cent debenture stock, redeemable	1,500,000	100	115½	89
5 per cent Bolivia debenture stock, redeemable	600,300	100	113	85
Aguas Blancas Railway:				
Stock	[a]$10,000,000	(a)	(b)	(b)
4½ per cent debenture stock	£836,629	£100	106	81
Anglo-Chilean Nitrate & Railways:				
Ordinary shares (30 per cent, 1917)	550,000	5	20	19½
Preference shares (30 per cent, 1917)	350,000	5	20	19½
4½ per cent consolidated mortgage bonds	347,300	100	103	81
Arica & Tacna Railway:				
Ordinary shares	450,000	20	5⅝	3⅞
Arauco Co.:				
Ordinary shares (10 per cent, 1917)	477,800	10	12⅞	12
5 per cent irredeemable first mortgage debentures	298,164	100	107	90
6 per cent redeemable second debenture stock	177,223	100	105	98
5 per cent income debentures	75,000	100	95	78
Carrizal & Cerro Blanco Railway:				
Capital stock	[a]$1,500,000	[a]$100	(b)	(b)
Chilean Transandine Railway:				
Ordinary shares	£100,000	£100	(b)	(b)
Preference shares, 6 per cent cumulative	1,400,000	100	(b)	(b)
5 per cent debentures, "Series A"	278,100	100	101	59
5 per cent debentures, "Series B"	538,650	100	101	60
5 per cent debentures, "Series C"	668,250	100	101	59
Nitrate Railways:				
Ordinary shares	1,485,340	10	15½	13½
Preferred converted	170,660	10	12¼	9¾
Deferred converted	170,660	10	5	5
Taltal Railway:				
Ordinary shares (9 per cent, 1917)	900,000	5	9¼	6
4½ per cent first charge debentures	185,100	100	103	94

[a] Quoted in Chilean paper currency; par value 100 pesos paper.
[b] Not quoted.

PUBLIC UTILITIES.

Public-utility developments in Chile have been steady and have attracted a large amount of foreign capital, particularly German and British. Practically all the cities and towns of importance are supplied with fresh water and are lighted by either electricity or gas. There are 34 tramway lines in the Republic, 13 telephone companies, and various telegraph systems, operated by the State or privately. The 34 tramway lines operate 254 miles of line (409 kilometers) and represent an investment of 56,039,759 paper pesos. During the year 1914 a total of 106,470,230 first-class and 43,926,878 second-class passengers were carried. Gross earnings totaled 13,875,681 paper pesos and operating expenses 10,011,366 paper pesos; net earnings amounted to 3,864,315 paper pesos, equal to approximately 6.9 per cent on total investments. A total of 831 cars were in service.

The 13 telephone companies maintain 268 offices and employ 1,097 persons. The subscribers number 18,208, and the value of property owned amounts to 11,866,696 paper pesos. The British-owned Chile Telephone Co. is by far the largest competitor in this field.

As previously stated, considerable amounts of German capital have been invested in the public utilities of Chile. The Compañía Alemana Transatlántica de Electricidad, which owns the electric-lighting properties in Buenos Aires, controls the Tranvías Eléctricos de Valparaiso, operating the tramway lines in Valparaiso and Vina del Mar, through ownership of a large majority of the $5,000,000 (United States currency) stock in the company. The former company also owns a very large interest in the Santiago Electric Light & Tramway Co. This latter company, with a capitalization of £650,000 preference shares and £404,700 ordinary shares, may be said to be an English-German corporation.

Data as to earnings, capitalization, etc., of various public-utility enterprises in Chile will be found in the Appendix (see p. 512). Among the prominent companies in the field may be mentioned the Tarapaca Waterworks Co., an English concern, operating the water system of the city of Iquique; the Valparaiso Drainage Co. (Ltd.), holding a concession to lay and maintain the sewerage system of the city of Valparaiso (a British company); the Chile Telephone Co.; the Cia. General de Electricidad Industrial, with the lighting and power privileges of the small cities of Rancagua, Temuco, Chillan, Curico, Lo Bravo, and San Fernando, located in south-central Chile; the Santiago Gas Co., a local concern; the San Bernardo Electric Tramways, suburban to Santiago; the Valparaiso Gas Co. (local); the Commercial Telegraph Co., etc. The gas companies operating in Valparaiso and Santiago have been very successful and have paid substantial dividends. The shares of both of these companies are quoted in the local markets at upward of par.

In the northern zone of Chile public-utility development has made fair headway. Most of the towns and cities have fairly good water, although this usually has to be brought from a considerable distance, in most instances from high in the Andes. The gas works in Arica represent an investment of approximately 245,000 paper pesos; the port is lighted by electricity. Tacna is lighted by electricity. Pisagua, the next place of importance to the southward, is lighted by paraffin or acetylene. Iquique, which has reached considerable size and importance, is well lighted by electricity and has a good tramway system. As previously mentioned, the Tarapaca Waterworks Co.[1]

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[1] This company has a capitalization of £240,000 shares, par £6. Dividends have been at the rate of 8 per cent per annum for a number of years. The net profits for 1917 were £45,861.

furnishes the water supply; this water is brought from Pica, in the mountains, a distance of 88 miles. Mejillones has rather inadequate lighting facilities, while Antofagasta has its local electricity plant, controlled by a company headed by the firm of Mitrovitch Bros., an important local concern of Russian origin. The drinking-water supply is furnished by the Antofagasta & Bolivia Railway, which has laid a pipe line from its collecting stations (blasted out of solid rock), located at San Pedro Station, 195 miles from Antofagsta. This water-supply reservoir, pipe line, etc., cost more than £1,250,000 and has paid a substantial return. A large portion of the nitrate district depends on this company for its water supply. Some of the springs are located at an altitude of 14,500 feet. Formerly Antofagasta had a street-car line, on which cars were drawn by horses. Several years ago, when the streets of the city were paved, this line was abandoned and the tracks torn up. At present the city, which has a population of more than 75,000, depends on a service of automobile omnibuses. As the area of the city is not great, this service is probably sufficient for its immediate needs. The construction of an electric traction line has been agitated and its possibilities looked into by various interests, including one American public-utility concern, but thus far nothing has been accomplished.

Taltal, the second town in importance in the Province of Antofagasta, has electric lights furnished by a local company. The power station is owned by the Taltal Railway, a British company. Water has to be brought from a point in the mountains, a considerable distance away.

Total investments in electric light and power properties in the Province of Antofagasta amount to 1,782,000 paper pesos.

Atacama, the next Province to the southward, contains no cities of any size other than Copiapo (population 11,056), located 50 miles inland from the port of Caldera. This former town is lighted by gas, the company furnishing the light having originally been formed by William Wheelwright, founder of the Pacific Steam Navigation Co. and builder of the first railway in Chile.

Coquimbo, the next Province to the southward, contains two cities of importance, Coquimbo (population 17,622) and Serena (population 16,149), and the town of Ovalle (population 8,311). Coquimbo is lighted by gas, and Serena has both gas and electricity. The electric company operating in Serena has an invested capital of 215,000 paper pesos.

Aconcagua, located to the eastward of Valparaiso, contains the growing cities of Los Andes and San Felipe, as well as several towns of moderate importance. San Felipe has a street railway—the cars being drawn by horses—and a lighting system. Los Andes has electric lights, power being obtained from the Aconcagua River, flowing from the mountain heights. In Aconcagua Province a total sum of 434,000 paper pesos is invested in electric lighting (one company) and 88,000 paper pesos in the gas plant.

Mention has been made of the various public utilities in Valparaiso and Santiago. It is stated that 5,547,224 paper pesos is invested in the two gas plants in the city and Province of Valparaiso (mostly in the Gas Co. of Valparaiso) and 9,000,000 paper pesos in the Gas Co. of Santiago.

O'Higgins Province contains the city of Rancagua (population 15,830). The Compañía General de Electricidad Industrial, previously mentioned, furnishes light and power for Rancagua. The capitalization of this company is 1,500,000 paper pesos, of which 262,056 pesos is invested in the Province of O'Higgins. The same concern furnishes the lighting for the city of San Fernando (population 10,869), capital of the Province of Colchagua, and for Curico (population 22,452), capital of the Curico district.

In Talca Province, farther to the southward, there is one electric company with a capitalization of approximately 387,000 paper pesos and an important gas works and system representing an investment of 1,052,834 paper pesos. Talca, the only city of importance, has a population of 42,088.

Concepcion, which has attained considerable importance, has electric traction service, which connects the city with the port of Talcahuano, 9 miles distant. The city is lighted by gas and electricity.

Public-utility enterprises also exist in several of the larger cities and towns to the southward, including Valdivia, Chillan, Temuco, and Punta Arenas. In the last-named city the Magallanes Telephone Co. has a capital of £60,000.

Undoubtedly there are opportunities in Chile for further public-utility development, particularly in modernizing some of the systems in certain of the small cities and towns and, in a few instances, in the construction of sewerage systems and filtration plants. Likewise there are prospects for interests well provided with capital to take over and consolidate various undertakings now in operation, forming holding companies similar to those operating in the United States. During the past two or three years certain banking and public-utility interests in the United States have partially investigated the field, although thus far practically nothing has been done. To date, other than the loan made by the Guaranty Trust Co. of New York to the Valparaiso Water Board, which is in reality a municipal enterprise, run by city and nation, no capital from the United States has gone into Chilean public utilities. It is a noteworthy fact that the shares of practically all the public-utility concerns listed on the local stock exchanges sell at a considerable premium.

MINERALS AND METALS.

Mining is to-day and will for many years continue to be the principal source of wealth in Chile. Almost every known variety of mineral exists in the Republic, and many of these are mined on a large scale. Chilean mining laws are liberal and all nationalities have the right to acquire claims. The general rights include the use of as much land as is necessary for the exploitation and survey of the mine, the erection of all necessary buildings, the laying out of roads and trails, the use of necessary water, timberland, and pasture. A small sum is payable to the Government as rental for each claim. As of January, 1916, the mining claims in force were as shown on the succeeding page:

Minerals.	Number of claims.	Minerals.	Number of claims.	Minerals.	Number of claims.
Gold	2,584	Iron	1,394	Coal	129
Copper	12,049	Manganese	109	Salt (ordinary)	378
Silver	605	Borate	2,351	Lime	451
Gold and copper	706	Sulphur	605	Potassic salts (nitrates)	1,398
Gold, silver, and copper	2,065	Petroleum	2,041		

The total number of claims in force in January, 1916, was 28,704, as compared with 28,541 in January, 1915.

The production of minerals, metals, nitrates, etc., in Chile during 1915 amounted to the following:

Minerals.	Quantity.	Value in gold pesos of 18d.	Minerals.	Quantity.	Value in gold pesos of 18d.
Gold ... grams	1,335,524	813,485	Iodine ... kilos	708,858	11,738,694
Silver ... do	40,445,061	1,006,237	Borate ... metric tons	14,869	2,081,660
Copper ore ... kilos	52,340,959	44,287,340	Common salt ... do	30,266	1,059,309
Iron ore ... metric tons	147,100	2,942,000	Sulphur ... do	9,769	1,172,280
Lead ore ... kilos	44,270	1,596	Clay ... do	14,425	144,250
Zinc ore ... do	5,760	3,129	Lime ... do	52,242	783,530
Molybdenum ore ... do	2,044	5,110	Gypsum ... do	4,700	141,000
Tungsten ore ... do	8,560	76,500	Guano ... do	11,944	477,760
Coal ... metric tons	1,171,564	29,289,100	Miscellaneous ... do	1,700	64,950
Nitrate ... do	1,696,877	201,858,465			

Dividing the minerals into three general classes, the production and the amount exported during 1915 were as follows:

Minerals.	Production, in gold pesos of 18d.	Exportation, in gold pesos of 18d.
Metallic substances: Gold, silver, copper, iron ore, tungsten ore, etc	49,142,847	49,806,618
Fuels: Coal	29,289,100	4,624,050
Salts and nonmetallic substances: Nitrates, iodine, sulphur, salt, borates, lime, clay, guano, etc	219,514,448	246,674,881
Total	297,946,395	301,105,549

In 1917 the value of the mineral production in Chile was 491,308,714 gold pesos, of which 40 per cent was produced by Chilean companies and 60 per cent by foreign companies (27.8 per cent British, 12 per cent American, 9 per cent German, etc.).

The various branches of the mineral industry will be discussed in succeeding paragraphs. The mineral wealth of Chile has attracted large amounts of foreign capital, particularly capital from the United States and Great Britain. In the nitrate industry British and Chilean companies hold at least 90 per cent of the developed properties, the division being about equal, and the remainder is mostly held by German and North American companies. The United States is taking increased interest in the field, the Dupont Nitrate Co. having acquired various properties, on which extensive development work has been begun. Other American interests have recently been looking over important fields to the southeast of Antofagasta. American investments in copper mines are very large, particularly those made by the Chile and Braden copper companies. The Bethlehem Steel Co. has acquired the most important iron properties in the Republic and American capitalists are looking into various other branches of mineral development.

NITRATES.

The nitrate industry in Chile showed results during the year 1916 such as were never before attained. The total production for the year was 63,323,770 Spanish quintals (of 101.41 pounds), equal to 2,905,627 metric tons, the monthly average being 5,276.926 quintals, or 242,136 tons. The year 1917 showed a still further increase (though a relatively small one), the production being approximately 65,100,000 quintals.

The production month by month during 1916 was as follows:

Months.	Spanish quintals (of 101.41 pounds).	Months.	Spanish quintals (of 101.41 pounds).	Months.	Spanish quintals (of 101.41 pounds).
January	5,641,671	May	3,353,913	September	4,726,102
February	5,291,841	June	5,163,700	October	5,242,701
March	5,457,414	July	5,312,776	November	5,082,805
April	5,337,592	August	5,396,981	December	5,326,823

The annual production since 1891 has been as follows:

Years.	Metric tons.	Years.	Metric tons.	Years.	Metric tons.
1891	771,915	1900	1,476,117	1909	2,085,929
1892	843,714	1901	1,289,470	1910	2,436,181
1893	972,618	1902	1,355,894	1911	2,491,129
1894	1,121,815	1903	1,467,667	1912	2,555,188
1895	1,302,459	1904	1,540,604	1913	2,739,381
1896	1,095,689	1905	1,733,799	1914	2,434,284
1897	1,166,774	1906	1,800,537	1915	1,696,877
1898	1,316,361	1907	1,824,146	1916	2,905,627
1899	1,398,171	1908	1,947,603		

The production of 1916 exceeded the 1913 production, which previously held the record, by 166,246 tons (3,657,412 quintals). The amount of nitrate exported during 1916 was 64,899,115 quintals, 1,575,345 quintals in excess of the production.

During the eight-year period 1907 to 1914 the world's consumption of nitrate increased from 1,738,680 tons to 2,708,968 tons. No authentic figures for a later date are obtainable, owing to the fact that the data from several of the warring nations of Europe can not be procured.

The nitrate industry of Chile, which during the year 1913 had reached unprecedented prosperity, was thrown into serious disorganization at the outbreak of the war. A number of oficinas were compelled to shut down and nearly all the companies in the field were compelled to reduce or suspend dividends. The return of business was almost as sudden as the crash that preceded the short-lived depression, and during 1916 most of the oficinas earned record sums. The rush of producers to reopen their plants, following the return of the demand for the product, caused a widespread demand for labor. and this problem was solved with difficulty owing to the fact that thousands of workmen had left the barren districts and scattered throughout southern Chile. Mules, which had been sent by hundreds to southern pasture lands, had to be shipped north and many problems were encountered. Whether the present prosperity in the industry will continue after the war is problematical. However, there will certainly be a demand for the product to replenish the overworked lands of Europe, following the close of the war, and this insures a considerable demand for a time, at least, although it is questionable whether the amount needed for creative purposes will equal that now used for destructive purposes.

Statistics follow showing the number of nitrate oficinas in existence, the number working, and the number of employees:

Years.	Oficinas in existence.	Oficinas working.	Number of workmen.
1913	169	127	53,161
1914	170	137	43,979
1915	171	116	45,506
1916	172	116	....
1917	172	124	....

A total of 192,362 tons of coal and 305,919 tons of petroleum were used as fuel during 1915. In 1913 the totals were 488,454 tons and 377,059 tons, respectively.

Of the 87 firms in the field in 1914, 51 were Chilean, 32 British, 3 German, and 1 American. A small number of the British concerns were partly financed by German interests. In the nitrate production for 1917 the Chilean companies accounted for 39.85 per cent, the British for 36.10 per cent, and the German for 12.24 per cent.

Shares and debentures of 21 of the nitrate companies under British control are actively quoted on the London Stock Exchange, their total capitalization amounting to nearly £9,000,000. These companies, during past years, have been generally successful, so that nitrate shares on the London Stock Exchange have come to be a much-sought form of investment.

The following figures, relating to important nitrate companies, are for the years ended June 30:

Name of company.	Net profits.		Dividends, ordinary and preferred.		To reserve, etc.		Carry forward.	
	1915-16	1916-17	1915-16	1916-17	1915-16	1916-17	1915-16	1916-17
Amelia	£49,412	£43,109	£13,820	£13,920	£32,197	£32,847	£3,721	£63
Colorado	19,837	15,023	8,000	8,000	7,500	8,277	1,548	294
Lagunas Syndicate	4,270	32,623	....	....	5,027	32,623	....	....
Liverpool Nitrate	103,414	107,819	48,280	68,160	50,000	42,159	11,445	10,549
London Nitrate	46,594	44,097	24,000	24,000	22,500	20,000	8,463	8,560
Pan de Azucar	1,384	6,526	....	....	....	....	6,740	13,266
Santa Catalina	19,257	18,338	15,800	15,800	1,956	2,470	325	393
Total	244,168	267,535	110,000	129,880	119,180	138,376	32,242	33,035

From the following summary of the principal items of the balance sheets it will be seen that there has been a general increase in stocks:

Name of company.	Share capital.	Debentures and loans.	Reserves.	Properties.	Stocks.		Cash and bills.	
					1915–16	1916–17	1915–16	1916–17
Amelia	£200,600	£126,900	£37,500	£333,656	£205,942	£253,478	£105,897	£166,770
Colorado	160,000	30,373	....	165,391	36,315	42,555	30,477	28,515
Lagunas Syndicate	550,000	394,380	68,197	849,698	27,823	74,897	124,374	159,980
Liverpool Nitrate	56,800	....	71,519	117,865	101,413	115,901	61,089	60,770
London Nitrate	160,000	....	138,155	260,397	33,413	50,822	63,282	84,137
Pan de Azucar	110,000	....	29,131	125,266	15,256	26,445	49,588	59,770
Santa Catalina	79,000	....	18,000	54,694	17,569	26,150	14,725	7,641

The Rosario Nitrate Co., at its annual meeting held April 11, 1917, declared a dividend of 11¼ per cent, as compared with 7½ per cent paid the previous year.

A number of the Chilean concerns engaged in the nitrate business have earned large profits during the recent period of prosperity. There has been heavy trading on the Valparaiso and Santiago Stock Exchanges in this class of securities, and there has been a pronounced advance in nitrate shares.

The following table will indicate the quotations on the ordinary (common) shares of a number of the leading nitrate companies whose shares are listed on the London Stock Exchange and on the local "bolsas" of Valparaiso and Santiago:

Companies.	Par value.	Approximate quotations.[a]	Companies.	Par value.	Approximate quotations.[a]
LISTED ON LONDON STOCK EXCHANGE.	*English currency.*	*English currency.*	LISTED ON LONDON STOCK EXCHANGES—continued.	*English currency.*	*English currency.*
Aguas Blancas	£1	£2	San Sebastian	1	⅞
Alianza	5	13½	Santa Rita	1	1
Angela	1	1¼	Santiago	4	1¾
Anglo-Chilean Railway & Nitrate Co.	5	19½	Tarapaca & Tocopilla	1	1
Colorado	5	4½			
Lagunas	5	1¾	LISTED ON CHILEAN STOCK EXCHANGES.	*Chilean paper pesos.*	*Chilean paper pesos.*
Lagunas Syndicate	1	⅜			
Lautero	5	11			
Liverpool	(5s.)	(77s.)	Antofagasta	25	150¾
London	1	2⅝	Loa	(£1)	[b] 51
New Paccha & Jazpampa	1	3	El Boquete	(£5)	[c] 80
New Tamarugul	1	1¼	Agua Santa	(£10)	[d] 245
Pan de Azucar	5	4½	Lastenia	(£1)	[e] 27½
Rosario	5	9	La Union	20	11
Salar del Carmen	1	2⅝	Castilla	20	17
San Lorenzo	1	3¾	Perseverancia	20	26

[a] The quotations of the shares listed on the London Stock Exchange are for January, 1918; those of the shares listed on Chilean exchanges are for May, 1917.
[b] Equal to £2⅝. [c] £3 12s. 3d. [d] £11. [e] £1¼.

One of the most important of the Chilean-owned companies is the Antofagasta Nitrate Co. (La Compañía de Salitres de Antofagasta). This company has a capitalization of 16,000,000 paper pesos and reserve funds of various descriptions (insurance, exploitation, eventualities, general reserve, etc.) to the amount of 22,773,672 paper pesos. Profits for the year 1916 totaled 10,198,656 paper pesos, from which a dividend of 6,400,000 paper pesos equal to 40 per cent on the stock, was paid and the balance carried to various reserve funds.

The production from the seven oficinas in operation during the year amounted to 3,134,881 quintals.

The Compañía Salitrera Lastenia (Lastenia Nitrate Co.), a local company capitalized at £500,000, earned a profit during the calendar year 1916 of £127,086, to which was added £11,187 dividend fund brought forward. From this there was paid during the year in dividends the sum of £123,469, equal to slightly less than 25 per cent on the stock. A total of 1,850,000 quintals was produced during the year, and 1,960,747 quintals were exported.

Iodine, the important by-product of the nitrate belt, was exported during 1915 to the amount of 1,562,764 pounds. Great Britain took 886,300 pounds; the United States, 555,380 pounds; France, 99,296 pounds, and Italy the remainder, 21,788 pounds.

COAL MINING.

Much has been written in the past concerning the coal-mining industry of Chile. While the production of the mineral falls far short of the nation's demands, it is nevertheless an important source of wealth. The difficulty of obtaining coal from foreign lands has caused an increase in the demand during 1916 for the local coal, particularly by railroads and steamship companies and by the mines in the north of Chile. Results in steamship boilers are said to have been better than anticipated, assuring, probably, a steady demand from that source for the product. As previously stated, there were, at the close of the year 1915, 129 coal mines in existence, mostly located within a comparatively short distance of the ports of Talcahuano and Coronel. These mines (such as are working) are operated by 10 mining companies, the production of which will be indicated in a subsequent table. Owing to the limited facilities and the necessity of enlarging many of the mining plants, the demand for the coal has exceeded the supply. The production of coal in Chile and its value and the amount imported during the period 1910 to 1915, inclusive, have been as follows:

Years.	Production.		Value of coal and petroleum imported.
	Tons.	Value.	
		Gold pesos.	*Gold pesos.*
1910	1,074,174	15,038,436	33,373,191
1911	1,188,053	20,197,071	32,168,560
1912	1,334,407	25,353,733	41,624,242
1913	1,283,450	24,385,550	46,986,333
1914	1,086,946	21,738,920	41,393,200
1915	1,171,564	29,289,100	20,289,100

Coal production during 1917 totaled 1,418,000 tons, valued at 38,289,000 gold pesos.

The amount of coal imported during 1913, under normal conditions, was 1,587,084 tons (coal and coke); during the same year 402,349 tons of petroleum were imported. In 1915, under war conditions, only 461,468 tons of coal and coke and 339,065 tons of petroleum were brought into the country. The coal came mostly from Great Britain, Australia, and the United States. The latter country and Peru and Mexico furnished the petroleum.

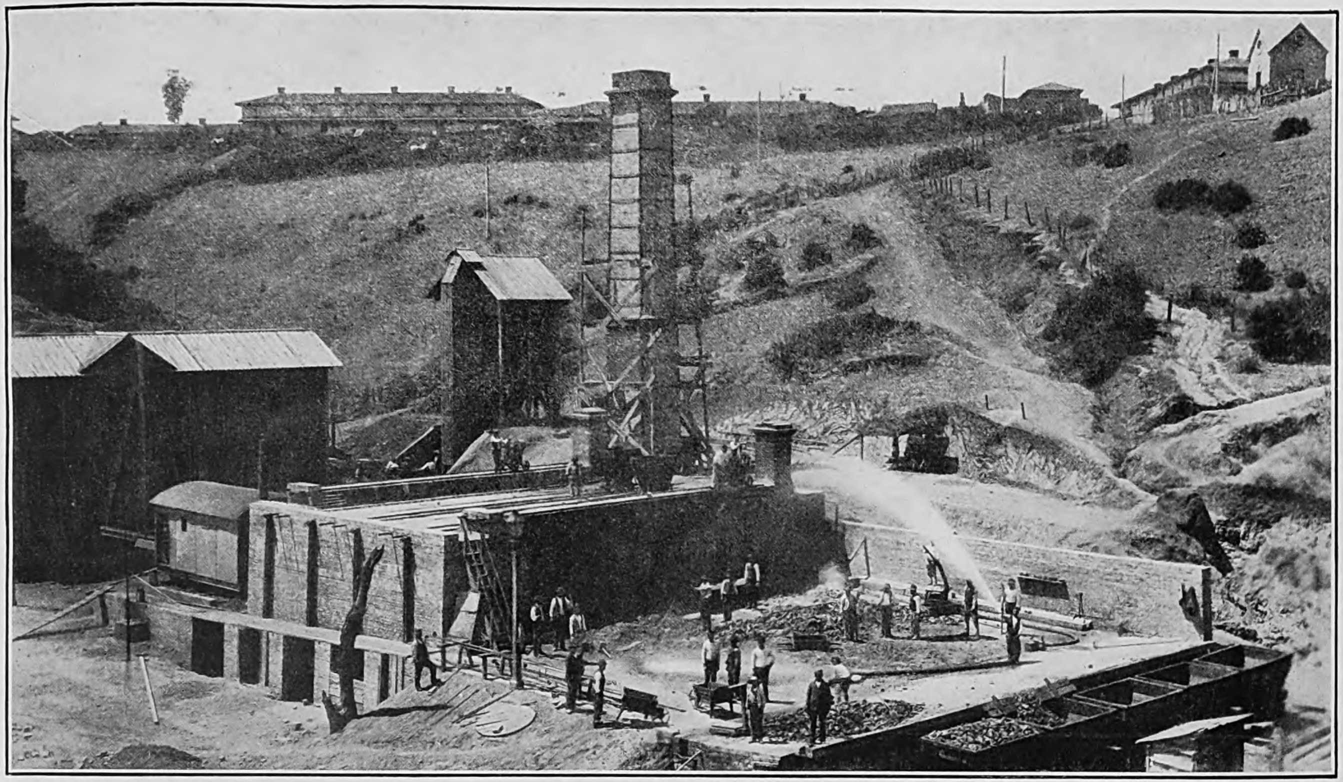

FIG. 14.—SCENE AT LOTA COAL MINES, CHILE.

The 10 coal-mining companies and their production during 1915 were as follows:

Companies.	Tons.	Companies.	Tons.
Lota & Coronel	393,611	Loreta Mines[1]	10,358
Schwager Coal Co	316,300	"Victoria" Lebu	9,000
"Rios de Curanilahue"	221,785	"Porvenir" Lebu	5,848
Arauco Co	140,662	Mafil Coal Co	200
Lirquen Coal Co	60,000		
"El Rosel" Co	13,800	Total	1,171,564

[1] Located near Punta Arenas, Straits of Magellan.

The majority of the above companies are local concerns financed in Chile, their shares being listed on the local stock exchanges. One important concern, the Arauco Co. (see also "Railways," p. 241), is under British control, its securities being listed on the London Stock Exchange. The capitalization of this company consists of £478,000 shares (ordinary) and approximately £556,000 debentures. The shares sell at a premium, and dividends are usually 8 per cent and upward. The value of the shares of the important coal companies in the above list will be found in the following table. With the exception of the Arauco Co., these shares are listed on the Santiago and Valparaiso Stock Exchanges, and the quotations are taken from the lists thereof.

Securities.	Par value.	Approximate market value.	
		January, 1918.	May, 1917.
Arauco Co.:			*Paper pesos.*
Stock	£10	£12	
First debentures, 5 per cent		90	
Second debentures, 6 per cent		98	
Income debentures, 5 per cent	100	78	
Lota & Coronel stock	[a] 100		476
Schwager Coal Co.[b] stock	10		1,600
"Rios de Curanilahue"	[a] 100		110
Mafil Co	[a] 50		65
Victoria de Lebu	[a] 10		9

[a] Chilean paper pesos.

[b] Compañía Carbonifera y Fundición de Schwager; shares of company valued in sterling at approximately £65.

IRON MINING.

The production of iron ore for the year 1915 amounted to 147,100 metric tons of 70 per cent ore, valued at 2,942,000 Chilean gold pesos. The principal deposit of the ore is found in the Coquimbo district, where practically 1,000,000,000 tons are said to exist. The principal deposits in this district have been acquired in the interests of the Bethlehem Steel Corporation, of the United States. A large fleet of 17,000-ton steamers is to be put in service to handle this mineral, which, it is claimed, can be mined and shipped at a very low cost. The property formerly belonged to a French company known as the Société des Hauts Fourneaux, Forges, et Acieries du Chile, which owns extensive iron deposits at Corral in south-central Chile.

The ore from the Bethlehem Steel Co.'s mines at Cruz Grande is excavated from the side of a hill and sent by means of short aerial ropeways to an overhanging cantilever discharger, by means of which it is discharged into the holds of the steamers, thus avoiding lighterage. The production of iron from these mines will be greatly increased in the future. The property is of considerable value.

In addition to the Cruz Grande mines there are numerous other iron deposits of present and future value. These are mostly situated in the mountain desert lands of northern-central Chile. None are as important as the Cruz Grande mines.

COPPER MINING.

Chile is a nation rich in developed and undeveloped copper ore. This field has attracted large amounts of outside capital, principally from North America. The two principal American companies engaged in the field are the Chile Copper Co., operating the mines at Chuquicamata, near Calama, on the Antofagasta & Bolivia Railway, and the Braden Copper Mines Co., operating the groups of mines known as the "Teniente," "Fortuna," and "Centinela," these being located in the neighborhood of Sewell, Province of O'Higgins. Other important mines are those of the Naltagua Copper Co. (controlled by a French company), which showed a profit of approximately 2,000,000 francs, mostly paid as a 5 per cent dividend on the company's shares.

The production of copper and copper ore during the year 1916 showed an increase of 19,349 tons of fine copper over the 1915 figures. The increased production at the mines of the Chile Copper Co. at Chuquicamata largely accounts for the greater output. The comparative figures follow:

Character of product.	1915		1916	
	Total production.	Fine copper.	Total production.	Fine copper.
	Tons.	*Tons.*	*Tons.*	*Tons.*
Copper bars	34,793	34,495	58,468	57,924
Copper ejes	17,041	8,101	8,572	4,295
Copper ores	62,079	9,485	53,716	9,211
Total	113,913	52,081	120,756	71,430

In 1916 the production at Chuquicamata and El Teniente was 1,396,600 tons, as compared with 1,061,280 tons in 1915.

At the close of the year 1915 there were in force 12,049 copper mining claims, scattered throughout almost every Province in the Republic. The value of the product mined during 1915 was 44,287,340 gold pesos of 18d. The 1916 figures, not yet made public, may be said to be far in excess of the 1915 total. Of the total production for 1915, 31,045,067 pesos represented bar copper (99.14 per cent pure copper), 6,156.840 pesos copper ejes (47.54 per cent), 6,924,431 pesos copper ore (15.27 per cent), 96,646 pesos copper and gold ores, and the remainder mixed gold, copper, silver, and lead ores. The mines producing the bar copper (34,394,516 kilos) were as follows:

Establishments.	Kilos.	Establishments.	Kilos.
Chuquicamata (Chile Copper Co.)	4,964,613	Na'tagua (Na'tagua Mining Co.)	2,991,000
Chorrillos	359,000	El Teniente (Braden Copper Mining Co.)	16,009,000
Gatico (a Chilean company)	2,818,448	Lota	3,946,000
Catemu	3,270,000		
El Huesco	20,000		
El Volcan	415,000	Total	34,793,061

In 1916 the production at Chuquicamata and El Teniente was considerably increased.

From the above total 34,494,519 kilos of pure copper were produced. The total production of bar copper in Chile during the years 1911 to 1914 was as follows: 1911, 16,723,649 kilos; 1912, 17,571,727 kilos; 1913, 20,150,144 kilos; 1914, 25,237,215 kilos. The 1914 production was valued at 19,986,711 gold pesos of 18d. (31,045,067 gold pesos in 1915).

The bar copper from the Braden mines is exported via Valparaiso. The Chile Copper Co.'s bars are shipped via Antofagasta. The Gatico copper bars are partly produced from custom smelting and are shipped from the port of Gatico, located a short distance south of Tocopilla. The concern is known as the Compañía de Minas de Cobre de Gatico, and owns, besides the smelting plant, a well-equipped mole. Employees are said to number nearly 2,000. Substantial dividends are paid. The remainder of the bar copper exported is largely sent through Lota, also noted as a coal-shipping port.

The copper ejes produced in 1915 were exported by the following companies:

Companies.	Ejes.	Pure copper.
	Kilos.	*Kilos.*
Cia. Minera de Calama (Chile Copper Co.)	322,658	109,703
Société desMines et Usines de Cuivre de Chanaral	3,554,684	1,949,744
Sociedad de Minas y Fundiciones de Carrizal	3,389,004	1,163,445
Central Chile Copper Co. (Panulcillo copper mine and smelter)	6,301,928	3,150,964
Cia. de Minas y Fundición "Incienso"	499,130	264,539
Guayacan	2,495,177	1,247,588
El Porvenir	478,052	215,123
Total	17,040,633	8,101,106

About one-half of the unsmeltered copper ore exported was sent through the port of Antofagasta. The remainder was shipped from Coquimbo, Caldera, Mejillones, Tocopilla, Taltal, Chanaral, Huasco, and various other ports and was produced by a large number of companies.

The Chile Copper Co., controlled by Guggenheim interests, is capitalized at $110,000,000 United States currency, consisting of $95,000,000 common or capital stock and $15,000,000 bonds convertible into stock at par. The mining property covers a very extensive area. Values of copper obtained are said to average slightly more than 2 per cent, with an average 90 per cent extraction, the yield per ton thus averaging about 36 pounds. Mr. Pope Yeatman, consulting engineer for the company, estimates, on the basis of 2 per cent copper, that the cost of the finished product, including delivery to New York or to European points and selling commissions, would be approximately $121.06 United States currency per ton. This, including all mining costs, would indicate that copper can be produced and delivered from the mines at about $0.06 per pound, a low record for porphyry copper mines. Owing to existing war-time conditions, costs are exceeding the estimates.

With its 10,000-ton plant in full service, the production of copper, at the average yield, would amount to about 120,000,000 pounds per annum, and with a 30,000-ton plant (probably the maximum production) 360,000,000 pounds of copper annually. On the 303,300,000 tons of copper in sight, the life of the mine would be 87 years at 10,000 tons per day or 29 years at 30,000 tons per day. With 400,000,000 tons of ore developed, its life would be 114 years and 38 years, respectively.

The table that follows indicates the estimated annual operating profits and the earnings per share, based on present capitalization, in handling 10,000 or 30,000 tons of 2 per cent copper daily. Costs are figured at the estimated rate of $0.06 per pound:

Copper at—	10,000-ton plant operating.		30,000-ton plant operating.	
	Annual profits.	Profits per share.	Annual profits.	Profits per share.
	U. S. currency.	*U. S. currency.*	*U. S. currency.*	*U. S. currency.*
14 cents	$10,080,000	$2.29	$30,240,000	$6.87
16 cents	12,600,000	2.86	37,800,000	8.58
18 cents	15,120,000	3.43	45,360,000	10.30
20 cents	17,640,000	4.00	52,920,000	12.01
22 cents	20,160,000	4.57	60,480,000	13.72
24 cents	22,680,000	5.14	68,040,000	14.43
26 cents	25,200,000	5.71	75,600,000	15.14
28 cents	27,720,000	6.28	83,160,000	15.85
30 cents	30,240,000	6.79	88,720,000	16.58

The par value of the shares of the company are $25.

During the year 1917 the production of copper at the Chile Copper Co. mines was 88,458,110 pounds, the largest quantity produced by any mine in South America.

In August, 1916, the Chile Copper Co. acquired the properties of the Calama Mining Co. for the sum of 7,000,000 Chilean paper pesos and will thoroughly develop these important mines. Following the acquisition of these copper mines the Chile Copper Co. petitioned for and obtained permission to acquire the franchise to construct a railway to connect with a branch of the Antofagasta & Bolivia Railway running from Conchi, 299 kilometers (186 miles) from Antofagasta. The principal properties are known as the San Jose del Abra Mines.

The Braden Copper Mines Co. is controlled by the Kennecut Copper Co., which also operates large and important copper properties in Alaska. The Braden Copper Mines Co. stock, which has mostly been exchanged for Kennecut shares, consisted in 1916 of 2,800,000 shares of a par value of $5, of which $12,981,500 was outstanding and the balance reserved for the conversion of $1,018,500 bonds (mostly 7 per cent bonds). In addition to the stock the company had outstanding $4,000,000 first-mortgage bonds of the Braden Copper Co., the entire stock of which is held by the Braden Copper Mines Co., and $15,000,000 15-year 6 per cent bonds. The first-mortgage bonds of the Braden Copper Co. are owned by the Braden Copper Mines Co. The shares sell in the New York market at a very large premium.

The Braden Copper Co. is registered in Chile and owns in fee at or near Sewall, Province of Rancagua, central Chile, 174 mining claims, equal to about 2,362 acres, and at Rancagua, Chile, owns about 16 acres for railway terminals and shops. At the present time it also has a concentrator with a capacity of 4,400 tons of ore per day, a complete smelting and converting plant, a hydroelectric power plant of 800-kilowatt capacity, and its own electric and steam railway—the latter about 43 miles long, connecting the company's properties with Rancagua, situated on the State Railway, about 43 miles southeast of Santiago.

The principal mines, as has been elsewhere stated, are known as "Teniente," "Fortuna," and "Centinela." These mines were discovered and worked by the Spaniards during the early part of the eighteenth century; later they were owned and operated by Chilean interests. The Braden Copper Co. acquired the property in the year 1904 and has carried on very extensive development work. Labor conditions are stated to be good. The ore is a concentrating copper ore, occurring as a sulphide in brecciated andesite around the periphery of an extinct volcano.

Mr. Pope Yeatman, consulting engineer of the Braden Copper Co., estimated, as of January 1, 1915, that the property contained 113,694,880 tons of ore, with an assay value of 2.84 per cent, and allowing for dilution in mining he reduces this value to 2.5 per cent. The final cost of production Mr. Yeatman estimates will be $0.06½, delivered either to New York or to European markets (under normal conditions all Braden copper is sold in Europe), and the value of the copper contents he places at $324,030,408 United States currency. The life of the mines is placed at 32 years from January 1, 1915, based on the above tonnage, with a plant having a capacity of 10,000 tons of ore per day.

It is expected that, with the 10,000-ton plant in full operation and handling the average grade of ore, the production will amount to 136,800,000 pounds of copper per annum, which would yield the following earnings, based on the estimated cost of production: 12-cent copper, $7,524,000 United States currency; 13-cent copper, $8,889,000; 14-cent copper, $10,260,000; 15-cent copper, $11,628,000; 16-cent copper, $12,996,000; 18-cent copper, $15,732,000; 20-cent copper, $18,468,000; and a further profit of $1,368,000 per annum for each 1 cent advance in the price of copper above 20 cents.

The operating cost for the year ended August 31, 1915, during which period the plant had not nearly attained full capacity, was 9.18 cents per pound, of which 2.33 cents was expended for mining, 3.26 cents for milling, 2.45 cents for smelting and converting, 0.13 cent for general expense New York, 1.17 cents for freight and delivery expenses, and 0.13 cent for selling commission. The employees numbered during 1916 between 1,500 and 1,800 men.

During a period of 15 months between January 1, 1915, and March 31, 1916, the following results were attained:

Items.	Amount.
	United States currency.
Copper produced, 46,822,116 pounds, at 19.356 cents average sales price	$9,063,213
Operating costs, including delivery costs	4,501,049
Operating profits	4,562,164
Total profits, including miscellaneous income	5,228,404
Net profit after interest deductions	3,599,977
Discount on bonds sold	1,350,000
Surplus for 15-months period	2,249,977

During 1917 the production at the Braden mines totaled 64,060,000 pounds.

An American syndicate has acquired and will work on an extensive scale the valuable group of copper mines known as the Tamaya mines. The Tamaya Copper Co., which controls these properties, is capitalized at $5,000,000 United States currency. There are now at work a large number of engineers and workmen. The Tamaya mines are located in the Province of Coquimbo, between Ovalle and Tongoy. The railway that runs from Tongoy to Ovalle was originally constructed from the former town (which is a minor port located 27 miles to the southward of Coquimbo) to the Tamaya mines. The line was built to the mines at as early a date as 1867, but, owing to the mine's being flooded and abandoned some years later, about 11 miles of the railway were abandoned and the destination of the line was changed to the town of Ovalle. This railway has since been acquired by the State and forms a portion of the Coquimbo Railway system. The Tamaya branch connects with the main line to Tongoy at Trapiche. There is a smelting works at Tongoy, which is a port of moderate importance for coastal trade and is sheltered from northerly winds. The ships loading here anchor about half a mile from the shore. Probably 150 tons of freight could be loaded there in a day. With a fair original outlay and efficient pumping plant (something not at the disposal of the former mine owners), the mine is expected to produce copper in large quantities. The property is an extensive and important one, and a long life as a producer is expected.

Space will not permit an extensive discussion concerning the local Chilean concerns engaged in copper mining. There is a large amount of local capital in various copper undertakings. Prominent among these concerns may be mentioned the following, all of which are public stock companies whose shares are listed on the Santiago and Valparaiso stock exchanges. The par value and approximate market quotation of the shares are indicated:

Companies.	Par value.	Approximate market value, May, 1917.
		Pesos.
Disputado	25 pesos	17.00
Gatico	£1	51.25
Poderoso de Collahuasi	£1	30.00
San Bartalo	20 pesos	9.00

Other important companies in the field are the Central Chile Copper Co., an Anglo-Chilean company, and the Sociedad de Minas y Fundición de Carrizal, also an Anglo-Chilean concern, which owns extensive mining properties at Carrizal.

SULPHUR MINING.

As of December 31, 1915, there were in effect 605 sulphur-mining claims, these being scattered throughout various sections of the Republic. The deposits yielded 9,769 tons during 1915, valued at $422,021 United States currency, and a considerably larger amount during 1916. In 1913 the production was valued at $280,640 United States currency. The production from 1910 to 1915 was as follows: 1910, 3,823 tons; 1911, 4,451 tons; 1912, 4,431 tons; 1913, 6,647 tons; 1914, 6,647 tons; 1915, 9,769 tons.

The largest sulphur-producing mine is the Buena Ventura, owned by Señor J. S. Concha and located near the town of Ollague at the foot of Mount Ollague, a live volcano, on the main line of the Antofagasta & Bolivia Railway. Another mine of growing importance is located at Tacora on the Arica-La Paz Railway. The various sulphur producers of Chile and their output for the year 1915 are as follows:

Mines.	Owners.	Tons produced.
Ollague (Buena Ventura)	J. S. Concha	2,600
Tacora	A. Dondero	1,000
Villa Industrial	Espado Bros	2,465
Chupiquina	Muecko & Co	500
Aguas Calientes	Vaccaro Bros	2,000
Ancanquilcha	J. B. Carrasco	864
Santa Rosa	M. Ballesteros	240
Carcote	Carcote Sulphur Co	100
Total		9,796

GOLD MINING.

Gold has been produced in Chile since prehistoric times. It exists in various parts of the Republic from the far northern Provinces to Tierra del Fuego in the far south. At the close of 1915 there were 2,584 gold claims registered in Chile. The gold production of Chile for the year 1915 was 1,335,524 grams, valued at $296,922 United States currency. The figures for 1913 were $278,667. A large portion of the 1915 output was produced by the various copper mines as a by-product. Some of it was dredged, however.

What was believed to be an important discovery in gold was made in the year 1911 at Patu, near Constitucion, no great distance south of Santiago. A company known as the Compañía Orero de Patu was formed with a capitalization of £85,000. There was a wild rush to buy these shares and on one occasion they sold at 220 per cent of par. The deposits turned out to be only of small depth and soon gave out altogether. However, a fair amount of ore was taken out previous to this and a large portion of the original investment was recovered. Operations at the mine were completely suspended early in 1913.

American interests have recently been investigating Chile as a field for gold development. As a result these interests (a New York syndicate) have purchased for the sum of 1,000,000 paper pesos the gold mines of Cerro Pillay, located in the department of San Javier.

The Vacas Gold Mines, under local management and control, are likewise of importance. The shares, which are of 10 pesos par value and sell at approximately 9 pesos, are listed on the stock exchanges of Santiago and Valparaiso.

There are a number of undeveloped gold deposits in Chile. These, however, are located in districts remote from means of transportation. Deposits have been located in the Provinces of Tacna, Atacama, Coquimbo, Maule, Valdivia, and in the Territory of Magallanes, including the island of Terra del Fuego. Gold is likewise known to exist in other Provinces.

SILVER MINING.

Silver mining is not carried out on a large scale in Chile. The total production for the year 1915 was 40,445,061 grams, valued at $367,277 United States currency. There were in force at the close of 1915 a total of 605 silver-mining claims, in addition to 2,065 gold, silver, and copper. A very large portion of the silver produced during the year was mined as a by-product of various copper-mining companies.

CHILEAN SALT DEPOSITS.

At the close of 1915 there were in force in Chile 378 claims for salt mines. The total production for the year amounted to 30,266 metric tons, valued at 1,059,309 Chilean gold pesos. This was the record production to date, comparing with 24,805 tons in 1914, 19,558 tons in 1913, and 17,045 tons in 1912. Of the 30,265,978 kilos produced during 1915, 15,443,800 kilos were taken from the Punta de Lobos Salt Mines, owned by the Compañía Esplotadora de las Salinas de Punta de Lobos. The production of this mine was valued at 540,533 gold pesos. Of the remainder of the Republic's production, a total of 8,100,000 kilos was taken from the salt lagoons owned by the firm of Vera Bros., 2,100,428 kilos from the Chacalluta mines, 2,000,000 kilos from the Juan Landeta lagoon, 2,000,000 kilos from the N. Landeta lagoon, 500,000 kilos from the J. Morral lagoon, 71,750 kilos from the Escritos deposits, and 50,000 kilos from the lagoon owned by the German Transatlantic Bank. About 350 men are employed in the salt industry.

MISCELLANEOUS MINING DATA.

Recent statistics indicated that the mining industry of Chile employed a total of 84,781 persons. Of these 53,161 were employed in the nitrate industry, 14,221 in copper mining, 4,250 in the metallurgy of copper, 8,414 in the coal mines, 830 in borates, and the remainder in various other mines of the Republic.

This account can not be closed without a word concerning the famous borax lake located at Cebollar near Ascotan on the Antofagasta & Bolivia Railway. This is chartered by the British-owned

Borax Consolidated (Ltd.), the largest borax concern in the world. The lake is 24 miles long and is located at an altitude of 12,200 feet. The Borax Consolidated (Ltd.) has outstanding approximately £4,000,000 shares and debentures.

OIL IN CHILE.

Petroleum has been found in various localities throughout southern Chile, including the island of Chiloe and the Patagonas district. Large quantities of this oil are believed to exist, and much is hoped for in the development of this field, which at present is hardly more than in its infancy. The claims in force at the close of 1914 numbered 3,363; these were, however, reduced during 1915 to 2,041. The principal public stock concerns in the field are the following:

Companies.	Par value of shares.	Market value of shares May, 1917.
	Pesos.	*Pesos.*
Chiloe	5	2.90
Pacifico	10	.95
Patagonia	2	1.90
Sud Americana	2	1.35

The above quotations are taken from the list of prices on the Santiago Stock Exchange.

Petroleum also exists in northern Chile, near the Bolivian frontier, on the slope of the mountains (latitude 22° 10′ 30″ south). This district has not been fully explored.

INDUSTRIAL DEVELOPMENT.

Manufacturing in its various branches has made fair headway in Chile. The peculiar formation of the country and the presence of numerous cities of fair size, each the center of some mining or other industry, results in a certain localization of the various manufacturing enterprises, each in its own region. Recent statistics showed that no less than 529,197,477 paper pesos was invested in manufacturing enterprises in Chile and that the most important of these factories produced during the year 1913 goods valued at 331,269,189 paper pesos. The employees numbered 80,697, and the average wages were 3.28 paper pesos.

As an indication of the development of manufactures in the Republic there is given below a table that indicates the principal industries, the number of establishments, the amount of capital invested in these various enterprises, and the production. The figures are in Chilean paper pesos. This table indicates the wide diversity of manufactures in the country and the fact that the largest investments are in mills, breweries, sawmills, sugar refineries, tanneries, furniture factories, and shoe factories.

Class of establishments.	Number of establishments.	Capital invested.	Production.
		Paper pesos.	*Paper pesos.*
Breweries	63	32,004,187	19,496,541
Glass manufacturers	3	3,499,059	2,747,973
Mills	179	73,160,603	87,217,319
Sugar refineries	8	25,967,501	29,602,420
Macaroni and vermicelli factories	40	5,354,981	4,699,056
Biscuit factories	12	2,274,874	3,870,340
Fruit canneries and manufacturers of fruit products	24	8,975,033	3,623,852
Meat factories	6	948,000	1,050,543
Shipyards	32	5,575,543	3,339,110
Hat factories	11	6,545,651	4,974,794
Corset manufacturers	5	1,643,438	2,185,262
Furniture factories	134	28,965,458	30,264,526
Sawmills	296	17,587,722	10,209,759
Cement factories	3	4,358,000	2,703,000
Textile mills	18	14,456,562	12,584,555
Manufacturers of industrial and agricultural machinery	2	4,580,000	3,800,000
Manufacturers of railway cars	4	2,155,913	3,645,446
Printers and publishers	302	26,218,181	36,154,862
Tanneries	129	30,698,491	29,617,205
Shoe manufacturers	45	20,988,120	26,366,961
Powder manufacturers	9	146,434	830,681
Soap manufacturers	66	10,432,395	12,284,984
Total	1,391	326,536,146	331,269,189

These manufactures largely represent local investments. The British are interested in the Chilean Mills (Ltd.), which manufactures and dyes cotton goods, in the Chilean National Ammunition Co. (Ltd.), and in other minor enterprises. Shares, it is said, are also held by British investors in the important Vina del Mar Sugar Refinery. This latter concern, which refines large quantities of sugar (mostly from Peru), is capitalized at 7,133,333 gold pesos. Profits for the second six months of 1916 amounted to 1,973,706 gold pesos, from which a dividend of 1,248,333 pesos, or 17½ per cent, was paid. Large reserves are on hand.

The sugar refineries in Chile are generally successful. The shares of the Vina del Mar Refinery Co. (see above) sell at more than three times par; the Chiclayo Refinery shares are worth about par; Penco del Azucar shares sell at about five times par.

The principal cement factory is owned by the Compañía Fábrica de Cemento Melon. This company has been very successful and its shares are quoted at about 3½ times par. Quarterly dividends of 5 per cent each are being paid.

Among the various breweries the Compañía Cervecería Unida is probably the most important. The latest semiannual dividend was 15 per cent. Shares are worth about 240 per cent of par.

MISCELLANEOUS FORMS OF INVESTMENT.

OPERATION OF ASCENSORS.

A form of investment quite popular in Valparaiso is in shares of the various local "ascensores" companies operating so-called ascensors from the lower portions of the city to various points on the heights. Owing to the peculiar topography of the city these ascensors are numerous and represent a considerable investment. Shares of 10 of these companies are listed on the Valparaiso Stock Exchange and most of them sell at a premium. The Compañía de Ascensores Mecánicos is probably the most successful of these concerns, 50-peso shares being worth 200 pesos. The Cerro Alegre, the Reina Victoria, and the Larrain companies are likewise profitable, the last-mentioned concern paying semiannual dividends of 7 per cent each.

STORES AND HOTELS.

British interests, similar to those in control of the South American Stores in Argentina and elsewhere, operate a large department store in Santiago, known as the Chilean Stores (Gath & Chaves, Ltd.). This company is capitalized at upward of $1,400,000 United States currency and does an extensive business (see Appendix, p. 514). There are other large stores of like character in Santiago and elsewhere, controlled by Chilean, French, and Italian concerns. There are no American department stores in Chile. German capital is largely invested in the drug business throughout Chile. There are several British printing, stationery, and book stores, as well as one British weekly newspaper. Other newspapers are numerous and represent a very large investment of local capital.

Hotels in Valparaiso and Santiago are far from sufficient for the needs of the cities. A new modern fireproof hotel is being erected in Santiago, but even this will be insufficient to take care of the business. Rather high rates are obtainable, and the margin of profit should be very large.

STEAMSHIP LINES.

There is one important steamship line, as well as several smaller ones, flying the Chilean flag. The most important of these companies is the Compañía Sud-Americana de Vapores. The dividend paid by this steamship company during the year 1916 amounted to 72 per cent, as compared with 20 per cent in the year 1915 and an average of approximately 10 per cent in previous years. The total net profit for the year 1916 amounted to 7,028,373 gold pesos, as compared with 2,213,037 pesos for the year 1915. Of the profit for 1916, 3,616,595 pesos was earned during the second half. Gross earnings for this latter period were 7,236,823 gold pesos, and for the entire year approximately 14,000,000 pesos. The capitalization of the company consists of 7,500,000 pesos shares, par value 100 pesos. These shares recently sold as high as 700 pesos, reflecting the great prosperity of the company. Reserves as of December 31, 1916, amounted to 4,680,712 gold pesos.

The company owns 10 steamships of a total net register of 14,808 tons, with tugs, lighters, etc., of a total of 3,870 tons additional. The original cost of the fleet was 10,259,000 gold pesos, which has since been written down to 2,146,982 pesos. The steamers are operated between Colon and Panama on the north and Paita, Salaverry, Callao, Mollendo, Arica, Iquique, Antofagasta, Coquimbo, Valparaiso, etc.

SANTIAGO AND VALPARAISO STOCK EXCHANGES.

The two "bolsas" or stock exchanges in Chile are very important institutions and, because of the general prosperity of the industries (particularly the mining industries) of the Republic, are centers at present of considerable activity. The approximate average annual business of the two stock exchanges is as follows:

Securities.		Stock exchanges.	
		Santiago.	Valparaiso.
Stocks	shares	3,018,800	3,715,308
Bonds	pesos	80,534,400	53,239,820

During the first four months of 1917, the average daily transactions in shares on the Valparaiso Stock Exchange amounted to 22,700. On the Santiago Stock Exchange transactions in shares varied from 20,000 to 30,000 shares daily. The Santiago Stock Exchange or Bolsa de Comercio, which is a corporation, showed a profit of 267,585 pesos during 1916, an increase of 32,341 pesos over the 1915 figures. Shares in the Santiago Bolsa de Comercio, which have a par value of 1,000 paper pesos, have a market value of about 63,000 pesos, and shares in the Valparaiso Bolsa de Corredores, with a par value of 5,000 paper pesos, are worth 100,000 pesos. A large number of nitrate, copper, Bolivian tin, coal-mining, and industrial companies have enjoyed unprecedented prosperity, which has been reflected in the greater activity of their shares. Practically every branch of business in Chile is in excellent condition and shares have generally advanced in market and intrinsic value.

LUMBERING ACTIVITIES AND TIMBER RESOURCES.

The forest lands of Chile cover approximately 5½ per cent of the total area of the Republic. These timber tracts are located largely in the south-central portion of the so-called "agricultural zone" and in the "island zone" as far south as the northern boundary of the Magallanes Territory. Some of the timber areas are large and important, among which may be mentioned a tract of about 100 square miles extending from near Valdivia to Temuco. The timber in this area averages about 9,000 feet to the acre. Additional tracts of great size are found in the island of Chiloe, to the south of Puerto Montt. The 60-mile, narrow-gauge railway constructed by the Government will make this timber available for shipment. Oak, Chilean mahogany, laurel, ash, pine, and other varieties of woods, hard and soft, are found. About 3,000 sawmills have been established. They are, however, mostly small. There are also pulp mills, shingle mills, etc., in limited numbers. Notwithstanding its forest areas, Chile is still importing lumber in large quantities. Transportation facilities in the forestal belt are extremely limited owing to the scarcity of roads. Most of the lumber is taken to the railway stations and sidings by wagons drawn by oxen. At the stations the lumber is graded into firsts, seconds, and thirds, the first and second grades going into floorings and finished boards and the third grade into boxes. This timber is generally kept at the railway centers for some time and is not shipped until dried and seasoned. The average price for first and second grade lumber, which constitutes about 60 per cent of the total cuttings, is from $12 to $18, United States currency, per 1,000 feet. The ash brings $25 per 1,000 and third-grade box lumber is worth about $8 per 1,000 feet. Shingles, usually packed in bundles of 100, bring approximately $3 per 1,000.

The Chilean Government, through the Department of Public Works, has at the disposal of those interested a considerable amount of useful data concerning its forest areas and opportunities therein. Plans have been laid for the construction of additional railways in the timber districts, assuring better facilities in the future for the marketing of the product; labor costs are not high and workmen are fairly plentiful. It may be said that the field offers opportunities for the investment of fair-sized amounts of capital.

AGRICULTURE AND VITICULTURE—LIVE STOCK-INDUSTRY.

Development along agricultural lines has been fairly steady during recent years. The rich central valley of the Republic produces grains, fruits, and vegetables of excellent quality and in good quantities. The Government is rendering assistance to the farmer and fruit grower through the development of an excellent system of irrigation canals, on which millions of pesos are being expended annually. During the years 1914 and 1915 Chile imported and exported vegetable products of the following values: 1914—Imports, 38,799,996 gold pesos; exports, 16,665,222 gold pesos. 1915—Imports 36,265,692 gold pesos; exports, 19,811,574 gold pesos.

During the year 1914–15, 5,218,036 metric quintals of wheat were produced, 2,597,964 quintals of potatoes, 2,857,923 quintals of hay, as well as large quantities of barley, oats, beans, maize, etc.

The grape industry in Chile is extremely important, a splendid variety of the fruit being raised in large quantities. Grapes are grown from Coquimbo as far south as Concepcion. Those produced in the districts near Coquimbo are used mostly for the making of wine, although fair quantities are sold for table purposes. Farther to the south the quality of the grapes improves and splendid varieties of wines are produced. The wine-making industry is most developed in the Provinces of Santiago, O'Higgins, and Colchagua, especially near the Maipu River. There are scores of large vineyards in this district. Farther to the south the quality of the grapes is not quite so good, though an excellent variety of wine is produced.

The wine is made and bottled or casked in some instances by the vineyard owners, in other cases by cooperative societies made up of a number of producers, or else the product is sold to wine distilleries. Several of these are capitalized at from $300,000 to $1,000,000 United States currency. There are a few foreign capitalists interested in the wine industry, but most of the undertakings are financed by local companies or individuals. Despite the excellent quality of Chilean wines, the exports in 1914 and 1915 amounted to only 175,245 gold pesos and 237,583 gold pesos, respectively. In comparison, foreign wines and liquors to the value of 4,102,085 and 2,225,471 gold pesos were imported during the two years. The production of wines during 1915 amounted to 2,329,896 hectoliters, to which might be added 346,787 hectoliters of light wines. It seems strange that Chile does not export larger quantities of the product. However, its two most available markets, Peru and Argentina, are also producers. A campaign of publicity in foreign countries would doubtless greatly increase the exportation.

It is very difficult to form an estimate of the value of vineyard lands. Developed vineyards are worth anywhere from $500 to

$2,500 United States currency per hectare, depending wholly on the location.

The raisins produced during 1915 amounted to 10,251 quintals.

The raising of domestic animals has become a very important industry in Chile, particularly in the Territory of Magallanes, where numerous large estancias exist, a number of them operated by large stock companies, some locally controlled, others under British or German ownership. Two of the important companies, financed locally, are the Tierra del Fuego Exploration Co. and the Laguna Blanca Co. Shares in these companies are worth several times par. Dividends of 20 per cent and upward are paid by them.

As of December 31, 1915, the number of live stock in Chile was as follows (a comparison with Dec. 31, 1913, is also shown):

Live stock.	1915	1913	Live stock.	1915	1913
Horses	725,181	470,332	Sheep	4,592,620	4,900,000
Donkeys	36.930	38,100	Goats	393,758	311,050
Mules	61,980	42,050	Pigs	229,416	170,000
Cattle	1,943,954	1,900,067	Llamas	22,675	....
Alpacas	13,108	....			

Of the 4,900,000 sheep in Chile December 31, 1913, 1,910,814 were in the Territory of Magallanes. The production of wool during the year 1916 amounted to approximately 20,000,000 pounds, as compared with approximately 9,400,000 produced in Peru. Exports for 1914 and 1915 were as follows: 1914, 12,162,330 kilos, valued at 9,950,398 gold pesos; 1915, 12,004,580 kilos, valued at 10,607,046 gold pesos.

A recent estimate made public by the Chilean Government indicated that land capable of cultivation for agricultural or fruit-raising purposes covered the following areas: Agricultural lands in cultivation, 280,256 square kilometers; territory in north capable of cultivation, 40,000 square kilometers; territory in Magallanes capable of cultivation, 60,316 square kilometers; territory wholly or in part barren (not fully explored), 370,000 square kilometers; total, 750,572 square kilometers.

A total of 27,020 agricultural machines are in service (3,777 motor).

SUMMARY OF CHILEAN FIELD.

Chile is prosperous and seems destined to maintain its prosperity. The rapid expansion of the mining industry and the general progress made along other lines is inviting very substantial sums of foreign capital, particularly (since the beginning of the war) American capital. While official figures are lacking as a means of confirmation, it is the writer's belief, following a study of investment conditions in South America, that Chilean enterprises have returned relatively larger sums on foreign capital than have investments in any other Republic in the Southern Continent.

The country has a progressive and enlightened Government and enjoys the confidence of foreign financiers and investors, inasmuch as it has never defaulted in its obligations, despite the fact that it has been a borrower for approximately 95 years. The field is generally worthy of the attention of capitalists.

COLOMBIA.

INTRODUCTION.

The Republic of Colombia has an area variously estimated at from 430,000 to 470,000 square miles. Its population, according to the census of 1912, totaled 5,072,604—the capital, Bogota, having 121,257 inhabitants, Medellin (the second city in size and importance) 71,004, and Barranquilla 48,907. Cartagena, Manizales, Sonson, Cali, Aguadas, Ibague, and Palmira are each estimated to have more than 25,000 inhabitants.

Large sections of Colombia are extremely mountainous, three ranges or cordilleras extending in a general northeast-and-southwest direction. The western range of these mountains borders the Pacific Ocean, the central is located between the Cauca and the Magdalena Rivers, and the eastern, on which Bogota is located, slopes down to the headwaters of the Amazon and its tributaries. One of the spurs of this eastern range finds its way far into Venezuela, forming the backbone of that Republic.

Numerous rivers of more or less importance play a considerable part in the economics and commerce of the Republic, the most important of these rivers being the Magdalena, which is not less than 1,020 miles in length and the main highway to Medellin, Bogota, and other large cities. This river is navigable for steamers over a large part of its course, although at one point a succession of rapids makes necessary the use of a railway. The Cauca River, which rises at no great distance from the headwaters of the Magdalena, joins the latter not far from the Caribbean Sea. The actual length of the Cauca River is 820 miles, and it is navigable for 325 miles in two sections.

The Atrato, the most westerly of the Republic's large rivers, empties into the Pacific at no great distance from the boundary with Panama. The river is of great depth in parts and is of considerable importance. Its length is more than 350 miles, about two-thirds of which is navigable. There are also a number of rivers of more or less importance emptying into the Atrato, Magdalena, and Cauca, while a number of large streams find their way into the Amazon and Orinoco Rivers.

The natural resources of Colombia are very great, and the country will offer constantly increasing opportunities for the successful investment of capital. As will be shown, the railway mileage is very small, and development along general lines has been extremely restricted owing to lack of capital. But the country is progressing at a substantial pace and capitalists are awakening to its potential resources. The mining industry holds great future promise, and already a number of important mines have been developed by American and European capitalists; there are oil, coal, emeralds, gold, copper, and various other minerals, banana lands, fine agricultural areas, grazing lands of almost limitless area, and vast forests. Opportunities for the gradual development of the public-utility field exist, since thus far no great progress has been made and already certain cities of the Republic have given evidences of sufficient credit to secure loans from American bankers at moderate interest rates.

EXTERNAL DEBT.

In 1889 the Republic of Colombia, which in 1886 had changed its name from the United States of Colombia, arranged a plan to provide for the consolidation of the debt assumed by the Republic. The new bonds for which the plan provided were to be known as "The Consolidated External Bonds of 1890," to be issued to the amount of £2,420,000 and to bear interest at the rate of 3 per cent per annum until December 31, 1899, and at 4 per cent per annum thereafter. The principal of the old bonds was to have been converted into the new bonds at par and interest in arrears at 50 per cent of the nominal value. Twenty per cent of the gross customs receipts of the country were to have been assigned to the payment of the interest on the new bonds and the sum of £12,000 per annum assigned as a sinking fund, the Government to have the right to redeem the bonds by drawing at 70 per cent of par until December 31, 1894, and at 80 per cent thereafter.

This plan, which had been agreed upon by representatives of the Government and the Committee of Foreign Bondholders, of London, representing the bondholders, did not meet with the approval of the Colombian Congress, and in 1896 the above agreement was modified, the interest rate being placed at 1½ per cent for the first three years, 2 per cent for the second three years, 2½ per cent for the third three years, and 3 per cent per annum thereafter. The sinking fund was placed at ½ per cent, cumulative, for the first three years, 1 per cent for the second three years, and 1½ per cent thereafter, cumulative.

In 1900 the interest on the loan was not met; payments were resumed July 1, 1905, and the sinking fund, which had likewise been suspended, was resumed January, 1910. The unpaid coupons were exchanged for non-interest-bearing certificates, 70 per cent of which were paid off in 1907 and 1908, the remaining 30 per cent being subject to the settlement of certain alleged claims of Colombia against another Government.

In 1906 the Government issued £300,000 5 per cent bonds, secured on the property of the Bogota-Sabana Railway, the proceeds of the loan to be used to convert the paper currency of the country. The sinking fund for this issue was fixed at 1 per cent per annum, cumulative. Approximately £275,000 of these bonds remained outstanding in 1916 (see "Railways," p. 273).

In 1911 7,560,000 francs (£300,000) 6 per cent bonds were issued in France, being offered for public subscription at about 98 per cent. The bonds were declared redeemable within 30 years through the operations of an accumulative sinking fund, and the entire service on the loan guaranteed by the assignment of 3 per cent of the entire customs revenue. This issue is known as the 6 per cent external gold loan of 1911.

During the year 1913 £1,500,000 bonds were authorized, practically all of which were issued in exchange for the 6 per cent bonds of the Colombian National (Girardot) Railway, on the following terms:

Class of former bonds (Colombia National Ry.).	Former amount of railway bonds outstanding.	Percentage of new bonds offered for old bonds.	New bonds.
6 per cent first mortgage debentures	£200,000	107	£214,000
6 per cent second mortgage debentures, including £84,000 overdue interest	400,000	85	340,000
6 per cent customs-guaranteed bonds	430,000	95	408,500
6 per cent customs-guaranteed debentures	450,000	95	427,500
Total	1,480,000	....	1,390,000

Approximately £1,224,360 of the Government bonds were issued in exchange for the railway bonds, and of those issued approximately £981,000 remained outstanding at the close of 1917. The bonds were quoted at 70 in January, 1918, this comparing with the high price since 1911 of 88½ and the low price of 55. The Government bonds are to be redeemed by purchase in the market, or by drawings at par, on or before March 1, 1947. The yearly service is secured by the hypothecation of 7 per cent of the annual customhouse receipts of the Republic, any deficiency to be made up from general revenues (see account of Colombian National Railway, p. 272).

Referring again to the Consolidated External Debt, the present interest rate on which is 3 per cent per annum, it may be stated that interest has been regularly maintained since 1906, even during the extremely difficult war period. The sinking fund payments were suspended during a portion of 1915 and of 1916. The amount of bonds outstanding just before the close of 1917 was £2,078,400, which total has since been reduced slightly. The £590,000 bonds purchased for redemption by the Government cost £291,195, an average of 49.35 per bond. The price of bonds under the issue in January, 1918, was 49½, as compared with 50¼ at the closing of the London Stock Exchange, July 27, 1914.

The Government of Colombia has guaranteed interest on a small amount of bonds of railway companies operating in the Republic (see "Railways").

The total external debt of Colombia amounts to $3.50 United States currency per head.

INTERNAL DEBT.

According to the statement of the Committee of Foreign Bondholders, of London, the total internal debt of Colombia, as of May, 1915, amounted to $5,376,888 silver, the interest on which amounts to £27,476 per annum. The interest rates on certain of the internal loans are as high as 10 and 12 per cent per annum. The internal floating debt of the Republic, as of June, 1915, was stated as follows: Originally issued, $15,460,516 gold; redeemed, $10,246,789 gold; balance outstanding, $5,169,771 gold. This internal floating debt is largely in the form of railway drafts, some of which were issued for construction costs; the remainder of the debt consists of Treasury certificates, certificates of war, Treasury bills, highway bonds, etc.

MUNICIPAL LOANS.

In the year 1916 the municipality of Bogota contracted a loan with the American International Corporation, of New York, for $5,000,000, the proceeds to be used largely to carry out public works. Later in the same year Medellin arranged for a loan of $400,000 at 10 per cent, with 1 per cent per annum extra in lottery drawings. A large portion of this loan, also for public works, was locally subscribed, and it is said that some of it was taken by New York banking interests. A few other municipalities have contracted small loans to construct waterworks and make general improvements. These loans usually carry high interest rates, a fact occasioned by the generally high money rates, which vary from 12 to 24 per cent per annum. A number of the cities and towns of Colombia are contemplating making sanitary improvements, laying out water-supply systems, and installing or improving electric-lighting plants. Most of these projects await the end of the European war.

BANKS.

The development of banks and banking in Colombia has of necessity been rather restricted. Bogota has naturally taken first place among the banking centers, it being the capital and largest city. The four banks of Bogota, with their capitalization (expressed in United States currency), are the following: Banco de Bogota, $250,000; Banco Central, $2,300,000; Banco de Colombia, $780,000; Banco Hipotecario, $500,000. The total deposits of these four banks in 1916 amounted to nearly $6,000,000. At the beginning of 1915 the financial standing of the banks was as follows (figures are in United States currency):

Banks.	Capital and reserves.	Deposits.	Profits, six months.	Mortgage certificates.
Banco de Bogota	$350,000	$1,520,018	$32,500	None.
Banco Central	2,643,000	706,000	79,600	$1,040,000
Banco de Colombia	812,750	2,638,000	32,750	442,000
Banco Hipotecario	549,100	393,600	60,200	943,000

Among other banks of more or less importance in the Republic may be mentioned the Banco Comercial de Barranquilla, at Barranquilla; the Banco Alemán-Antioqueño and the Banco de Sucre, at Medellin; the Banco Comercial, at Cali; and the Banco de Bolivar and the Banco Unión, at Cartagena.

RAILWAY DEVELOPMENT.

There are within the Republic of Colombia to-day not more than 700 miles of operated railway—16 railways existing, the longest of which is only 149 miles. There is not a single "trunk line" in the

Republic and the various existing systems simply act as connections between various centers of population and some river or sea port of outlet, or else form means of routing traffic around rapids or river bars.

The principal railways of Colombia, with their approximate operated mileage, are:

	Miles operated (estimated).
Amaga Railway	23
Antioquia (Puerto Berrio) Railway	108
Barranquilla Railway	17
Cartagena Railway (Colombia Railway & Navigation Co.)	65
Cucuta Railway	45
Dorada Extension Railway	71
Colombian National (Girardot) Railway	86
Pacific (Cauca) Railway	149
Great Northern Central Railway	12
Colombian Northern Railway	39
Sabana Railway	25
Santa Marta Railway	99
Colombian Southern Railway	21
Tachira Railway	10
Tolima Railway	75

The Amaga Railway is a local enterprise, financed and constructed by Colombians. The line is to be carried eventually from Medellin to the River Cauca. Plans were laid to link up the railway with the Antioquia Railway, running from Puerto Berrio on the Magdalena River. The authorized capitalization of this company was fixed at $1,000,000 Colombian gold.

ANTIOQUIA RAILWAY.

The Antioquia Railway is the oldest line in Colombia, its charter dating as far back as 1874. The terminus of the railway is at Puerto Berrio on the Magdalena River, and the line is being carried by slow stages toward Medellin. The railway seems to have about as good prospects as any in Colombia, and its earnings ($590,278 in 1913) are at present larger than the earnings of the various other lines in the country. At the outbreak of the European war construction work was temporarily suspended, the amount expended on the line up to that time having been in excess of $3,000,000 United States currency (the cost of the 102 kilometers—63 miles—from Puerto Berrio to Sofia totaled $2,978,037). The work has been carried on almost entirely out of surplus profits from operations, although on several occasions unsuccessful efforts have been made to obtain loans abroad.

Puerto Berrio, the terminus of the line, lies at an altitude of approximately 400 feet above the sea. The railway from that point follows the course of the Malena River, the route being low and swampy, this necessitating a considerable amount of bridging and filling in. From the head of this little river the line climbs across a ridge into the valley of the Nus, the heaviest grade encountered being 4.5 per cent. The Nus River is reached at Pavis, about 48 kilometers (30 miles) from Puerto Berrio, the cost of the 48 kilometers being estimated at $1,616,800 gold. From this point numerous engineering difficulties—really colossal, at times—have had to be overcome very slowly, owing to the scarcity of funds. A tunnel of considerable size yet remains to be completed.

BARRANQUILLA RAILWAY & PIER CO.

The line operated by the Barranquilla Railway & Pier Co., a British corporation, is 18 miles in length and extends from Puerto Colombia on the Caribbean Sea to Barranquilla, the principal port for the Magdalena River, the mouth of which is not navigable on account of obstructions.

The Republic of Colombia had the right to purchase the property at a fair valuation in 1913, but did not exercise that right. In 1923 the Government may purchase the property "at a fair valuation less 20 per cent" and in 1933 "at a fair valuation less 40 per cent." The capitalization of the company consists of £250,000 shares, par £10, of which £50,000 was given as a bonus in 1913. There is also outstanding £100,000 6 per cent first debenture stock, principal repayable at 110 at the option of the company on six months' notice. This debenture stock was quoted in January, 1918, at 94. The dividend payments on the stock during recent years have been at the following rates: 1908–9, 2½ per cent; 1909–10, 3 per cent; 1910–11, 4 per cent; 1911–12, 5 per cent; 1912–13, 5 per cent cash and a bonus of 25 per cent in stock; 1913–14 to 1916, 5 per cent per annum; 1917, 6 per cent. The annual receipts of the company at present exceed £75,000. The gross earnings for 1914, as expressed in Colombian currency, totaled $35,678,876.

COLOMBIA RAILWAY & NAVIGATION CO.

The Colombia Railway & Navigation Co. is the successor of the Cartagena Railway and operates a 65-mile line of railway from Cartagena, a port on the Caribbean Sea, to Calamar, on the Magdalena River. The capitalization of this company consists of the following securities:

Ordinary stock, par £1, £750,000. No dividends are being paid, and the price of the shares (January, 1918) is approximately 9d.

Navigation debentures, 6 per cent. Secured on steamboats and other property. Interest regularly paid, through 1916. Quotation January, 1918, 43 per cent.

Railway debentures, 5 per cent. Interest on these debentures is to be paid March 30 and September 31, dependent on profits up to 2 per cent per annum after payments on the Navigation 6 per cent bonds and 3 per cent after provision has been made for a renewal and repair fund of £5,000 and the Navigation bond redemption fund of £6,399 per annum, when it comes into operation in 1918. On two occasions during the past five years part of the interest was paid in cash; on other occasions the interest payments were made wholly in deferred interest warrants, to be redeemed out of profits. The bonds were quoted in January, 1918, at about 11 per cent of par.

Gross earnings for 1915–16 amounted to £233,076, as compared with £243,722 in 1914–15 and £333,944 in 1912–13. The securities are listed on the London Stock Exchange.

CUCUTA RAILWAY.

The Cucuta Railway was originally incorporated in 1866 to build a road for wagon traffic through the valley of Cucuta to Villamizar, a port on the River Zulia. Some years later a railroad was laid out by the company along the route previously selected as a road, the approximate present length being 45 miles. The line forms an outlet for traffic originating in the Department of Santander, affording connections with steamers running down the Zulia River to Lake Maracaibo, Venezuela.

The capitalization of the Cucuta Railway is $1,800,000 stock and an original issue of £120,000 6 per cent debentures, secured by a first mortgage on the property and originally issued in London at 95 per cent in 1887. Most of these debentures have been retired through a sinking fund of 2½ per cent per annum, cumulative, and the quotation in January, 1918, was 96 per cent. Dividends on the stock during recent years have been as follows: 1909, 1¼ per cent; 1910, 3 per cent; 1911, 3¼ per cent; 1912, 4½ per cent; 1913, 5¼ per cent; 1914 and 1915, 2½ per cent; 1916, 3 per cent. Most of the stock is held in Colombia.

DORADA EXTENSION RAILWAY—DORADA ROPEWAY EXTENSION.

The Dorada Extension Railway, 71 miles, forms a means of transportation around rapids in the Magdalena River and is thus a part of the route necessary in journeying from the Caribbean Sea to Bogota. The Government may purchase the line in 1961 at a fair valuation, this privilege extending until 1985; from 1985 to 2009 the cost price is to be one-half the valuation, and in 2010, if not previously acquired, the line reverts to the Government. The railway is of 3-foot gauge and carries a Government subsidy. The terminals are La Dorada and Ambalema.

The capitalization of this company is as follows:

Securities.	Amount.	High price since 1910.	Price January, 1918.
Stock, par £10	£350,000	£7¼	£4
First debenture stock	336,000	103	90
Second debenture stock	[a] 90,200	....	....

[a] Total authorized issue, £200,000; issued to acquire majority interest in the shares of the Dorada Ropeway Extension (Ltd.).

Dividend payments during recent years have been at the following rates: 1911, 2½ per cent; 1912 and 1913, 4 per cent each; 1914, 1915, and 1916, 3 per cent each. Gross revenue for 1917 totaled £106,949 (an increase of £7,207); net revenue, £61,384; other income, £2,602; total income, £63,983; brought forward, £1,197; surplus after charges, £29,832. The dividend for the year was 4 per cent, and £15,000 was added to reserve.

The Dorada Ropeway Extension (Ltd.) operates an aerial ropeway line from Marquita, a station on the Dorada Extension Railway, to Manizales. A large portion of the line has been completed. The capitalization is £220,000 £5 shares of an authorized issue of £250,000 shares, a majority of which are held by the Dorada Extension Railway. The gross receipts for 1915 were £7,530 and the operating expenses £5,500. During 1916 gross receipts increased to approximately £25,000, and there was a substantial net increase. This company was incorporated in 1912.

COLOMBIAN NATIONAL (OR GIRARDOT) RAILWAY.

The Colombian National (or Girardot) Railway extends from the port of Girardot, on the Magdalena River, to Facatativa, the junction with the Sabana Railway, running to Bogota, the capital. The gauges of the two lines are different (Colombian National Railway, 3 feet; Sabana Railway, 1 meter) and this necessitates a change of cars. The railway has not been greatly successful financially, and the shares have only a nominal market value. The bondholders a few years ago were offered Colombian Government bonds in exchange for their railway bonds (the terms of this exchange of securities will be found in the section of this chapter devoted to Government securities).

Of the £900,000 £1 shares, £300,000 were originally issued to the Government. No dividends have been paid. The £200,000 first mortgage debentures were originally issued in 1889 and are secured by a first charge on the company's railways and lands. Prior to the close of 1916 £191,760 had been acquired by the Government in exchange for Government bonds. The £400,000 6 per cent second mortgage debentures have all (except £5,500) been exchanged for Government securities. The interest on the second mortgage railway bonds has been in arrears since 1909.

In addition to the two issues of debentures mentioned in the preceding paragraph, there are two so-called issues of customs-guaranteed bonds secured, respectively, by third and fourth mortgages on the property. These issues total £430,000 and £450,000 and were issued in 1907 and 1908, respectively. Approximately £311,120 third debentures and £316,140 fourth debentures are held by the Government, having been exchanged for Government bonds. Interest is being paid on two issues of railway obligations, which are secured by customhouse receipts of the Republic.

The Government of Colombia has advanced to the Colombian National Railway the sum of £549,238, which is carried as a capital liability by the railway company. Gross earnings of the railway for the calendar year 1910 were £61,643; for 1911, £76,435; for 1912, £100,035; for 1913, £127,311; for 1914, £123,194; for 1915, £126,802; and for 1916, approximately £140,000. Large deficits have usually resulted after fixed charges were met. The mileage operated totals 86.

PACIFIC RAILWAY.

The Pacific Railway (Compañía del Ferrocarril de Pacifico) was authorized under the laws of Colombia to build a line from the port of Buenaventura, on the Pacific Ocean, into the Cauca Valley, thence to be continued to Bogota, 362 miles from the Pacific. Thus far approximately 238 kilometers (148 miles) of the line have been completed, or practically completed, as follows: Buenaventura to Cali, 174 kilometers (108 miles); Cali to Popayan, 34 kilometers (21 miles); Cali to Palmira, 26 kilometers (16 miles). The Palmira extension is to be carried northward to Ruga, Tuluma, and Cartago.

In 1911 there were offered in behalf of the railway company in London £119,200 5 per cent sterling five-year bonds at 93 per cent. This issue has since been liquidated.

The share capitalization of the company at the time of incorporation in 1908 was fixed at £280,000, divided into 14,000 shares of £20 each. The founders subscribed for 10,710 shares, the Banco Central, of Bogota, taking 5,600; 2,000 were offered to the public; and the rest were held for future use. It is said that interests identified with the United Fruit Co. have important stock holdings in the company. The equipment in service is mostly of American manufacture.

The Cartago section of the Pacific Railway is to be carried, if plans fully materialize, through the Quindio Valley and across the Central Cordillera through the Calaroa depression, descending to Ibague, the capital of the Department of Tolima, where connections will be made with the Tolima Railway (see a subsequent paragraph), now nearing completion.

COLOMBIAN NORTHERN RAILWAY.

The Colombian Northern Railway, which operates about 39 miles of line, extends from Bogota to Zipaquira, from which point it is expected that extensions will be built so that a trunk line may be formed between Bogota and the Magdalena River. The capitalization of the company consists of 300,000 shares of £10 and approximately £180,000 5 per cent first-mortgage debentures. These debentures were quoted at 79 per cent in January, 1918, and the shares at £4 12s. 6d. Dividend payments on the shares have been as follows: 1906–7, 2 per cent; 1907–8 to 1909–10, 2½ per cent each; 1910–11, 2 per cent; 1911–12, 3 per cent; 1912–13 to date, 4 per cent.

SABANA RAILWAY.

The Sabana Railway is under Government control and forms part of the through route between the Magdalena River and Bogota. The Government issued in 1906 £300,000 bonds secured by a mortgage on this property. The line is 25 miles in length and is of a different gauge from the Colombian National (Girardot) Railway, with which it connects at Facatativa, but has the same gauge (1 meter) as the other short railways entering Bogota.

TOLIMA RAILWAY—COLOMBIAN SOUTHERN RAILWAY.

The Tolima Railway, which, when completed, will be 160 kilometers (99 miles) in length, is to extend from the Magdalena River, at Girardot, to Ibague, where connections will be made with the Cauca, or Pacific Railway, now building. The Tolima Railway has been nearly completed, and the whole line is expected to be in operation by the spring of 1918. When it is connected with the Cauca Railway a through route will be opened between Bogota and the Pacific port of Buenaventura, and a part at least of the through traffic to and from the interior will doubtless be routed this way.

The Colombian Southern Railway serves a local territory, which has considerable agricultural wealth. The line is the property of the Colombian Government.

SANTA MARTA RAILWAY.

The Santa Marta Railway, 99 miles in length, has its terminus at the Caribbean port of Santa Marta, where quays and other properties are owned. The line extends into a territory extensively cultivated with bananas and, it is expected, will be eventually carried to the Magdalena River, 138 miles from the sea. The railway is the property of a British company, incorporated in 1887. The company has acquired, as a subsidy from the Government, 100,000 hectares (247,104 acres) of uncultivated land.

The capitalization of the Santa Marta Railway consists of £159,170 7 per cent and participating preference shares, £200,000 ordinary shares, and approximately £175,000 6 per cent debentures. No dividends have been paid on either class of stock, although interest has been regularly met on the debentures. These debentures sell on the London Stock Exchange, the price recorded in January, 1918, having been 90 per cent. The net profits for 1912, 1913, and 1914 were £17,413, £19,690, and £20,907, respectively. The credit balance of net revenue account as of September 30, 1915, amounted to £15,115, as compared with £24,778 as of September 30, 1914. The percentage of working expenses to gross earnings in 1914 was 86.47, as compared with 85.99 in 1913 and 82.81 in 1912. The gross receipts amounted to approximately £154,500 in 1914, but in 1915 and 1916 the figures were lower.

The United Fruit Co. owns 11.65 miles of railway and 11.64 miles of tramways in Colombia, the value of these as carried on the company's books being $66,858.

DISCUSSION OF COMPREHENSIVE PROGRAM FOR RAILWAY DEVELOPMENT.

At the Pan American Financial Conference held in Washington during 1915 there was a discussion as to the feasibility of constructing a railway line from Barranquilla, running parallel with the Magdalena River to Girardot or some other point within rail connection of Bogota and the various cities of upper Colombia. Feeders were to be constructed or existing lines enlarged so that all the principal centers of population were to be placed in touch with the main line of the proposed railway. Lines were also to be constructed to the regions of the east, including 1,200 miles of road to reach the great plains of the Amazon. This railway construction would cost, on the average, $50,000 per mile. Long-delayed plans would be put into operation whereby the mouth of the Magdalena River would be dredged, so that ocean-going steamers might proceed up the river to Barranquilla.

The Colombian law, it was stated at the conference, authorizes the Government to subsidize railway construction up to $16,000 per mile, and it grants up to 300 hectares (741 acres) of public lands per mile of railway constructed, to be located on either side of the line.

The law grants to the constructors of the railways the privilege of usufruct of the railway up to 50 years, after the expiration of which period it can be continued for 25 years more, but the Government may during the last period buy the railway from the concessionaires at an arbitrated price.

Although there seems but little prospect that such a scheme as that mentioned will be carried into immediate effect, owing to the high cost of materials and to various other reasons, the need of a comprehensive railway program leading to the development of the great potential wealth of the Republic is evident. The proposed upper Magdalena River to Quito, Ecuador, section of the so-called Pan American system, long discussed, will probably not be constructed at present. The territory is thinly settled, and while there is undoubtedly a considerable amount of undeveloped wealth along the proposed railway route, the construction costs would probably prove too heavy a burden to allow any profit to the builders.

PUBLIC UTILITIES.

Public-utility development in Colombia has not attained importance. There are in the Republic five electric light and power plants and properties, representing an investment of $1,086,000. There are tramways, operated by electricity, steam, or otherwise, in Bogota, Barranquilla, Cali, Cucuta, Cartagena, and Medellin. The telephone service in Bogota is furnished by a British company, the Bogota Telephone Co. (Ltd.), registered in 1900, which has a concession lasting until 1952. This company is capitalized with £18,200 preferred stock and £18,607 deferred stock, the preferred stock being entitled to 99 per cent of the profits. The preferred stock received an initial dividend of 6 per cent in 1912–13, while 10 per cent was paid in 1913–14, 12½ per cent in 1914–15, and 16 per cent in 1915–16. The company formerly had debentures outstanding, but these were redeemed in 1912. After the dividend payment from the profits of 1915–16, the sum of £1,790 was carried forward.

The street railway line in Bogota, which is operated by the municipality, carried 4,566,892 passengers during 1913, as compared with 3,887,373 during 1912. The gross earnings from operations for 1913 totaled $230,916, operating expenses were $108,134, and net earnings were $122,782. The net car-mile revenue during 1913 amounted to $2,026, as compared with $1,823 in 1912.

MINING ENTERPRISES.

Almost every known variety of commercially important minerals exists in the Republic of Colombia, and a future of considerable promise is in store for the mining industry, once better means of communication are established. Numerous mines and various mining areas are practically inaccessible owing to lack of railways and roads. Large British interests and some American and German concerns have obtained concessions to mine gold and platinum. At the close of 1915 the number of known mines in five important Departments (States) of Colombia was 18,386—12,181 in the Department of Antioquia, 2,452 in the Department of Narino, 2,610 in the Department of Caldas, 641 in the Department of El Valle, and 502 in the Department of Tolima. In addition, minerals (including gold) are to be found in the Department of Bolivar, in the Choco Intendency, and elsewhere.

The production of copper in Colombia antedates even the Spanish Conquest, but is not to-day an important industry. During the period of Spanish control a considerable amount of the ore was mined in a primitive way, being obtained principally from rich oxidized ores along or near the surface. Old copper mines are found in the Departments of Antioquia, Boyaca, and Tolima, the mines in Boyaca being worked in a small way. The mineral is also known to exist in the Departments of Bolivar, Cauca, Cundinamarca, Santander, and elsewhere. In the Department of the Cauca the principal deposits are at San Lorenzo, Cali, Pichinche, and Andagueda. The general development of the industry in that Department and elsewhere awaits better transportation facilities.

COMPANIES ENGAGED IN GOLD MINING.

Gold is the most important mineral produced; the exports of gold bars in 1915 amounted to $3,580,108, of gold dust to $1,126,904, and of gold coins to $415,212. The Breitung Mines Co., of Delaware, with a capitalization of $1,527,590, acquired some time ago the property of the Marquette Magdalena Co. The mines were not operated, however, during 1916, and no dividends are being paid. The Compañía Minera de Zancudo, with office at Medellin, operates the Zancudo, Chorres, Cateador, and Muriel gold and silver mines and works a small smelter at Sitio-Viejo. The ores, as stated, are principally gold and silver, with a small amount of copper as a by-product.

Great Britain has successfully entered the gold-mining field in Colombia, and the results of several of the more important British-controlled mines will be found in the Appendix (see p. 517). The most important of these British mines are the Pato Mines, the Nechi Mines, the Frontino & Bolivia Mines, etc. The Pato Mines cover an area of about 40,000 acres located near Zaragoza, Department of Antioquia. The company's capitalization consists of £100,000 shares and approximately £212,000 8 per cent income notes. A dredge is being operated, and the property holds considerable promise. It is controlled by the Oroville Dredging Co., through ownership of £70,000 of a total of £100,000 stock. The latter company also controls the Nechi Mines, through ownership of the £70,000 ordinary stock. The preference shares of the latter company, £70,000 outstanding, are entitled to and are receiving 25 per cent per annum and are further entitled to one-half of the surplus profits. During the 10 months ended June 30, 1916, the yield of gold was valued at $525,130.

The Frontino & Bolivia property was registered in Great Britain during 1911 as the successor to a company of similar name, incorporated in 1886 to acquire the original Frontino & Bolivia Co., which began operations in 1864. The company owns mines, covering about 5,000 acres, located near Medellin, its capitalization consisting of £45,538 10 per cent debenture stock due 1921, £23,390 10 per cent and participating preference shares, and £140,000 ordinary shares of £1 each, of which 14s. has been paid in. Dividends of 10 per cent per annum were paid on the preference shares during 1913–14 and 1914–15, and a dividend of 10 per cent was paid on the ordinary shares during 1914–15. The dividend rate on both classes of stock has been since increased. The yield of gold during 1912–13 amounted to £86,972; 1913–14, £88,311; 1914–15, £115,628; 1915–16, £115,469.

The Tolima Mining Co., another British corporation, owns gold and silver properties in Colombia, including the Frias Silver Mines and water-power rights at Tolima. The authorized capitalization of this company is £100,000, par £1, of which 17s. has been paid in. Dividends were regularly maintained on the stock until 1914; there have been none since.

The New Timbiqui Gold Mines (Ltd.) owns gold placer claims in the Timbiqui River, the properties covering rights on about 865 square kilometers (334 square miles) of territory. The capitalization of the company is £200,000, par £1, and during 1915 a dividend of 5 per cent was paid on the stock. In 1913 the gold production was valued at £38,750 and in 1914 at £33,380. Operations were begun in 1907.

The Colombian Mines Corporation (Ltd.), also a British company, acquired gold mines in the Remedios district. This company began business in 1883; and during its early years paid substantial dividends. The company's leases of two properties, the Sucre and the Providencia, expired in 1913 and, on account of conditions brought about by the war, it was deemed wise to lease the Sucre property to other interests temporarily. The capitalization of this company is £26,204, of which £11,204 is classed as "A" stock and £15,000 as "B" stock.

The Colombian Mining & Exploration Co. was registered in London in 1908, to acquire gold and silver properties in the districts of Supio and Marmeto and in the municipalities of Apia, San Clemente, Ansermaviejo, Sucio, Rio Sucio, Nazaret, and Marmeto. The principal property was known as the Marmeto Hill mine, and considerable development work has been carried on there. The capitalization consists of £50,000 6 per cent debentures and £450,000 stock. A receiver was appointed in 1915 on behalf of the debenture holders. A new reduction plant of considerable size has been placed in operation.

The Palenque Gold Mining Syndicate, formed in 1898, acquired a hydraulic property located at Palenque, Department of Hondo. This property in 1909 was leased to another company for 10 years in consideration of 25 per cent of the profits. The capitalization of the company consists of £20,000 priority and £50,000 ordinary shares, par £1. Dividends of 8d. and 4½d., respectively, were paid on the two classes of stock both in 1905 and 1906, but none have been paid since.

The Platinum & Gold Concessions of Colombia (Ltd.), a Belgian company, capitalized at £86,573 (£150,000 authorized), has acquired alluvial platinum and gold properties known as the Bajo Opogado, located not far from Novita, Colombia. The property is about 15 kilometers (9.32 miles) in length by 2 kilometers (1.24 miles) in width. Information concerning earnings is not available.

A French company known as the San Antonio Gold Mines Co. (Ltd.), registered in 1912, has acquired a gold mine concession near Cali, Department of Valle. The capitalization of the company at the time of formation was £70,607. The results from its operations are not available.

The list of gold-mining companies given in the preceding paragraphs is by no means complete, there being other mines in operation in which local, American, and European capital is interested. The estimated gold production of Colombia since the Spanish conquest has exceeded $600,000,000. During the same period probably $30,000,000 worth of silver has been produced.

EMERALD MINING.

The emerald-mining industry in Colombia dates its origin long before the conquistadores of Spain turned their eyes toward the

Western World. When Bogota was first settled in 1534 the Spaniards made every effort to discover the location of the emerald deposits which were known to exist not many miles from the settlement. Their endeavors were long frustrated by the opposition of the powerful Indian tribes of the district. Finally, however, in 1594 mining operations were begun, the work being carried on wholly by Indian slaves. Great treasures were taken from the district during the Colonial period, a very large portion of the revenues going to the Spanish Crown.

A number of mines were worked by private interests during the first 30 years of the Republic, and fair results were obtained. In 1848 the Colombia Congress decided that thereafter all emerald mining would be carried on under the supervision and for the benefit of the Government, profits to go into the national treasury. This state of affairs continued until 1908–9, when a British company obtained a concession to develop an extensive area. The company was provided with a fair amount of capital and carried on considerable development work, but without much success. The enterprise struggled along until 1914, when it was deemed advisable to wind up the company's affairs. The mines were taken over by the Government under judgment for £250,000 ($1,216,625), and the shareholders received back a portion of their investment. Since the outbreak of the war in Europe and the consequent cutting off of the principal market for the gems, operations have been confined by the Government to the maintenance of the property.

Information at hand is of too vague a character to make possible the expression of any opinion concerning the advisability of an American company taking over the property. Nothing should be done without thorough investigation and ample capital. The latter is particularly necessary owing to the fact that exhaustive searches, necessitating much unproductive labor, must be made in order to discover productive formations. Furthermore, the mines are difficult of access, being three or four days' journey by mule back from the nearest railway. The emeralds are then sent through Bogota over the long and expensive rail and water routes to the world's markets.

Colombia is the chief emerald-producing country, the output in a normal year amounting to about 800,000 carats. That the industry is likely to long continue a source of wealth to the Republic is indicated by the fact that, in addition to the field already developed, two new deposits have been located. However, these deposits (at Cosquez and Somondoco) are at present inaccessible owing to transportation difficulties. At least one of the latter emerald fields is as rich as the Muzo deposit now being worked.

PLATINUM.

Platinum mining has assumed great importance in Colombia. The platinum is found, usually in conjunction with gold, in the Atrato, Condoto, Platina, and San Juan Rivers and elsewhere in the Republic. The principal platinum-bearing zone is about 90 by 30 miles in area, and is one of the richest platinum deposits in the world. The production of this mineral has increased from 245 troy ounces to 11,046 troy ounces, valued at $494,888, in 1915 (in 1912 $594,188 worth was exported). An American company with a capitalization of $750,000 was formed late in 1915 to mine the platinum. In 1911 the Anglo-Colombian Development Co. (Ltd.), controlled in the interest of the large and important Consolidated Gold Fields of South Africa (Ltd.), a British company, was formed with a capitalization of £250,000 to acquire certain platinum-bearing lands in the Intendency of the Choco. Large sums have been expended in dredging operations.

IRON.

Iron ore has been found in what promises to be large quantities in the Department of Cundinamarca, in which Bogota is situated. Other deposits of ore have been located, but these are mostly inaccessible owing to the inadequate means of transportation.

COAL.

Coal was first discovered in Colombia in the year 1882, the outcrop occurring in the bed of the Aracataca River, which flows into Santa Marta Bay. Numerous other deposits of coal have since been found, a large quantity existing in the neighborhood of Cali. Some of the deposits are being worked in a rather crude way and produce sufficient fuel for the needs of the country. It is said that sufficient coal might readily be mined to take care of the needs not only of Colombia but of Ecuador, Venezuela, Panama, and other near-by countries.

SALT.

There are salt deposits at Nemocon, Zipaquira, Sesquile, and Tausa in the Department of Cundinamarca. The product of the mines in 1912 was valued at $810,679. The Zipaquira mine, which is probably the most important salt property, has returned to the Government a revenue of $21,928,147 during the period 1883 to 1912. Salt mining is a Government monopoly.

ASPHALT.

Asphalt deposits have been located in the upper Magdalena River district, and some small shipments have been made from Santander. Other products of the mine are quicksilver, magnesia, marble, alum, chalk, lead, sulphur, and lime.

PETROLEUM.

Oil has been found in the Republic, and concessions have been granted to several companies to exploit the field. One American company expended approximately $750,000 in an unsuccessful effort to produce oil in paying quantities in the Sinu district; another American company secured concessions in the Bolivar district, along the Caribbean coast, and also at places on the Magdalena River. Oil is also known to exist in the eastern section of Colombia, adjacent to the various rivers that empty into the Orinoco and Amazon. This petroleum, it is said, may be seen running over the surface of the rivers.

The following account of the oil fields of Colombia is from a paper on "Petroleum Resources of South America," by Frederick G. Clapp, S. G.:

The prospective oil fields of Colombia are grouped by Ralph Arnold into Caribbean, Pacific, Magdalena-Santander, and Tolima districts. Their total area is estimated by him as 34,000 square miles (88,060 square kilometers) and their probable petroleum territory only 618 square miles. Only 2 square miles are stated as now proven. According to the writer's classification, the fields will be grouped as follows:

A. Caribbean district.
    1. Caribbean field.
        (*a*) Tubura pool.
        (*b*) Turbaco pool.
    2. Magdalena-Santander field.
    3. Tolima field.
B. Pacific district.

A. CARIBBEAN DISTRICT.

1. *Caribbean field.*—The Caribbean field is supposed to extend from Rio Hacha, on the western edge of the Goajira Peninsula, southwestward along the Caribbean coast to the Gulf of Darien and Gulf of Uraba, "and inland to include the Tubura and Turbaco pools and the region as far south as 30 miles (48 kilometers) south of Chima, on Sinu River, and Monpos, on San Jorge River, and up the Arato River valley for 90 miles from Punta Arena. It occupies portions of the Departments of Magdalena, Bolivar, and Cauca." It is approximately 300 miles (482 kilometers) long and 50 miles wide, contains 15,000 square miles (38,850 square kilometers), and has 300 square miles of probable productive territory, of which only 1 square mile has been proven by drilling.

The known pools in the Caribbean field are named (1) Tubura and (2) Turbaco. The Standard Oil Co. of New York did some drilling in the Sinu Valley, near Lorica.

Tubura pool.—This pool is 20 miles east of Cartagena and quite close to Barranquilla. A Canadian company has drilled three wells from 699 to 3,018 feet deep (213 to 919.88 meters), at least one of which yielded 7 or 8 barrels of oil daily. Colombia seems to be the only South American country in which natural gas is known in large quantity, and its principal supply is in the Tubura pool. A plan has been suggested to pipe the gas to the city of Barranquilla for use in lighting, cooking, and generating power.

Turbaco pool.—This field is 12 to 15 miles south of Cartagena. Diego Martinez & Co., in association with the Standard Oil Co. of New York, drilled five wells 500 to 2,200 feet deep. Diego Martinez & Co. also own a small refinery in Cartagena, where imported oil is refined.

2. *Magdalena-Santander field.*—The Magdalena-Santander field, "probably as important, but more inaccessible and less well known than that along the Caribbean coast, includes the southern part of the Department of Magdalena, the Department of Santander, and the western edge of the Department of Boyaca, extending from the Magdalena River to the eastern Cordilleras. It also occupies an area in the southeastern part of the Department of Bolivar." It covers a belt about 200 miles (321 kilometers) long and 50 miles wide, having an area of 10,000 square miles (25,900 square kilometers), of which only 200 are believed to be productive, while only 1 square mile has been proven. A small refinery, which handles the product of a few wells for local trade, is situated at Pamplona.

3. *Tolima field.*—Under the Tolima field are grouped the petroliferous occurrences in the upper Magdalena basin, in the Departments of Cundinamarca and Tolima, and on the edge of the San Martin and Casanare plains. While this district has an area of 7,000 square miles, only 100 are believed to be productive, and none have yet been definitely proved.

B. PACIFIC DISTRICT.

The Pacific district in the Department of Cauca, as defined by Arnold, includes a belt 60 or 70 miles (96 to 112 kilometers) long, extending along the Pacific coast north of Buenaventura to Baudo River, reaching inland to Atrato

River at Quibdo and as far south as Cali on Cauca River. The area of the Pacific district is given as 1,800 square miles, of which the probable productive territory is considered as only 18, none being yet proven.

CONDITIONS GOVERNING EXPLOITATION.

The oil fields of Colombia have long drawn some attention from outside capitalists, who have realized, in a vague way, that oil exists there. Unfortunately, the explorations have resulted in little success, owing, perhaps, to three main causes:

(*a*) The explorations of large oil companies have, until recently, been mainly in a comparatively few localities near the coast and adjacent to certain main rivers.

(*b*) It has not been realized in all cases that geologic conditions, while fundamentally similar, present many unusual phases in every country examined, and that these discrepancies must be taken into account before condemning a district as unfavorable.

(*c*) Much of the country is an almost impenetrable jungle, through which well-drilling machinery can be transported only at great expense.

The production of Colombian petroleum has, as yet, not really commenced. In the Magdalena-Santander field the wells are shallow and the production small, although of good promise. In the Caribbean field only ten wells are known, the production of which is given by Arnold as less than 10 barrels per well per day. There is no reason, however, in the opinion of the present writer, to suppose that the Colombian fields will ultimately prove to be less valuable than those of Peru.

SUMMARY OF POSSIBILITIES.

As has been indicated, the possibilities in the mining field, particularly in placer mining, seem very promising, although transportation difficulties and, in certain sections, insalubrity of climate have greatly retarded development work. Lode mining is even more difficult to carry on, inasmuch as most mines are not easily accessible and the cost of transporting machinery is excessive.

AGRICULTURE AND STOCK RAISING.

Perhaps one-third of the total area of Colombia is capable of more or less successful development along agricultural lines. Coffee, bananas, tobacco, and other products may be grown readily, and almost every known variety of cereals, fruits, and vegetables exists. Bananas form a very important export, the United Fruit Co. having invested $2,849,498 in lands, plantations, etc., in the Republic. This American company owned on September 30, 1916, 26,253 acres of improved land (27,917 acres in 1915) and 56,301 acres of unimproved land. About 16,233 acres of land are under cultivation for bananas and 9,779 are used as pasture land, the company owning in Colombia 2,866 head of cattle and 290 other animals.

About 6,000,000 bunches of bananas are exported annually through the port of Santa Marta alone, practically all of the fruit going to the United States. Large shipments are also made through the port of Cartagena. Banana exports have reached a total of $3,000,000 per annum during certain years, the average exports, 1911 to 1915, exceeding $2,500,000 per annum.

Coffee is the Republic's leading product, more than 149,000,000 pounds having been exported during 1915. The value of the 1916 exports was $15,996,032, as compared with $16,247,672 in 1915, $16,098,185 in 1914, and $18,369,768 in 1913. The coffee exported represents approximately 95 per cent of the total annual crop. The principal coffee districts are in the Department of Cundinamarca, in which there have been planted about 30,000,000 trees out of a total of slightly more than 80,000,000 trees in the entire Republic. The coffee of Cundinamarca is generally known commercially as "Bogota" coffee. Other important coffee districts are in the Departments of Santander, Tolima, and elsewhere.

A fair amount of sugar and cotton is raised for local consumption, and rubber and tobacco are being exported, although not in considerable quantities. The untouched areas of rubber trees are large, but the rubber industry is subject to prevailing general conditions. The tonka bean, used as a substitute for vanilla, is also found in the forests.

Colombia has vast areas of natural pasturage, some of which are used to-day for stock raising while others are awaiting future utilization. There are said to be about 7,000,000 cattle in the Republic. The exportation of cattle hides has become third in importance among the nation's industries, and there promises to be a very pronounced demand for the cattle products of Colombia once a system of packing houses is established. The relative proximity of Colombia to ports of the United States gives the South American Republic an advantage over most of its competitors in American markets. Endeavors are being made to improve the breed of the animals through the introduction of high-bred stock.

The great llanos of eastern Colombia, which extend across Venezuela also, are said to contain some of the finest cattle ranges in the world, assuring the future of the cattle industry in Colombia. These rolling plains are drained by the upper waters of the Amazon and Orinoco Rivers and their numerous tributaries, assuring sufficient water. Once suitable roads are built to open this territory, the cattle lands are certain to be utilized and stocked, there being sufficient room and pasturage for many millions of animals. To-day most of the animals exported are raised either along the banks of the Magdalena and some of its tributaries or near the various Caribbean ports.

FOREST PRODUCTS.

Nearly all the known varieties of hardwoods are found in Colombia, these including lignum-vitæ, quebracho, mahogany, cedar, walnut, etc., as well as vast quantities of mangroves and similar trees. The tagua or ivory nut is gathered, although its quality is said to be unequal to that of Ecuador. Although some of the forests are situated near navigable rivers and are thus accessible, the forestal development of the Republic awaits improved transportation facilities, and much of the timber wealth is thus reserved for a future day and generation. Only a very small amount of lumber and hardwood is being exported at the present time, exports of forest products being restricted mainly to the tagua or ivory nut.

MANUFACTURING.

According to statistics published by the Colombian Government. there were in the Republic, at the close of 1915, 121 manufacturing plants, representing an investment of $12,406,000 United States currency. Consul Claude E. Guyant, at Barranquilla, states, however, that the Government's list is not quite complete, as several well-known factories were not included. The statistics that follow have been obtained from Consul Guyant's report:

Establishments.	Number.	Capital invested.	Establishments.	Number.	Capital invested.
Textiles and thread	21	$3,530,400	Shoes	6	$255,000
Sugar	1	2,000,000	Tanning extract	1	200,000
Oil refining	1	1,200,000	Glass	3	150,000
Electric light and power	5	1,086,000	Iron foundries	3	53,000
Flour	6	780,000	Carbonated beverages	7	38,200
Matches	5	750,000	Distilled liquors	1	22,000
Chocolate	8	515,700	Perfumery	1	10,000
Cigars and cigarettes	8	428,000	All others	18	204,300
Cement and artificial stone	3	420,000			
Beer and ice	5	433,000	Total	121	12,406,000
Soap and candles	18	330,400			

Two of the plants (sugar and oil) have a capitalization of more than $1,000,000 each; 3 textile factories and one electric plant have capitalizations of more than $500,000 each; 10 enterprises (4 textile mills, 1 flour mill, 2 match factories, 1 cement factory, 1 chocolate factory, and 1 tanning extract plant) are capitalized at $200,000 to $500,000 each, 12 factories at $100,000 to $200,000, 15 at $50,000 to $100,000, 50 at $10,000 to $50,000, and 28 at less than $10,000.

The city of Bogota contains 40 of these industrial plants, with a total capitalization of $3,013,000; Medellin ranks next in importance, with 30 plants, capitalized at $2,380,600; Barranquilla has 18 factories, capitalized at $1,370,000, and Cartagena 12, in which $2,993,000 is invested. The statistics for the latter city include a sugar mill at Sincerin, about 20 miles away, which is capitalized at $2,000,000. Despite the fact that there are 21 textile mills in the country, goods of this character to the value of $3,343,383 were imported in 1915.

SUMMARY OF INVESTMENT PROSPECTS.

Colombia as a field for the investment of foreign capital offers, by reason of its geographical location and the vastness of its resources, many opportunities for substantial returns. Great Britain is estimated to have placed no less than $33,000,000 in Government bonds, railways, mines, etc. Most of the British-owned railway lines (all of which are small) are prospering, and, as has been indicated, some of the mines have realized substantial returns. France and Belgium have invested fair-sized amounts in mining development, Germany in banks and platinum mines, and the United States in mines, banana lands, municipal loans, etc. Those familiar with Colombia unanimously agree that its natural resources are vast and that, when it is opened up by means of railways and roads, the development of the country will be very rapid. Following the possible influx of immigration, countless opportunities are certain to present themselves for the safe and successful investment of capital. As the country advances, public-utility enterprises—now few in number—

will be established, manufacturing enterprises will be enlarged and improved, agricultural areas will be developed, and new mines will be discovered and worked. There would doubtless be opportunities for the establishment of companies operated along lines somewhat similar to those that characterize the activities of the British South African Co. and other enterprises of that character. These companies, if provided with ample capital, could doubtless invest profitably in lands along the eastern Andean slope and in the eastern savannas. This wholly undeveloped territory, which is of vast area, is said to be extremely rich and to offer great future prospects for successful development along varied lines—agricultural, mineral, pastoral, and forestal.

ECUADOR.

INTRODUCTION.

Ecuador occupies a nearly three-cornered area of territory, stretching from the Pacific Ocean to the upper valleys of the Amazon. Colombia lies to the north and Peru to the south. No two authorities agree as to its exact area or population, the boundaries of this Republic and its neighbors being in dispute. Possibly 120,000 square miles and 1,500,000 inhabitants would be fair estimates. There are possibly 80,000 people in Quito, 80,000 in Guayaquil, 30,000 in Cuenca, 14,000 in Riobamba, 12,000 in Latacunga, 10,000 in Loja, and from 6,000 to 9,000 each in Ambato, Esmeraldas, Guaranda, and Ibarra. Few of the cities and towns have assumed importance as yet, and a very large percentage of their population is of the Indian race.

Ecuador, although its development has been extremely slow, may be said to offer many opportunities for future development. A certain amount of American, British, French, and German capital has been attracted to the country, and a vastly larger amount will follow immigration. Thus far only a few settlers have come to Ecuador, but in time the agricultural possibilities of the Republic will serve to bring them in increasing numbers. The low, hot coastal lands, unlike the shores of Peru and Chile, are covered in many places with dense tropical vegetation and are more productive than the coastal districts of the neighboring countries. To the east of these plains rises the vast cordillera of the Andes, culminating in giant peaks, no fewer than 21 of which are perpetually capped with snow. Many of the mountains are volcanic, some of the volcanoes being active. Between the mountain ranges are cool valleys, and to the east lies the forest-covered Oriente.

NATIONAL DEBT.

The financial history of the Republic of Ecuador commences as early as 1834, during which year the Republic was made responsible for £1,424,579 of the original Colombian debt (21½ per cent), upon which the arrears of interest amounted to £683,798.

In 1855 the total debt was fixed at £1,824,000, of which £400,000 was given in exchange for approximately £1,000,000 arrears of interest. The balance of the arrears of interest was largely settled by a land grant and by the delivery to the bondholders of $860,000 Peruvian 4½ per cent bonds.

In 1890 the bonds of 1855 were converted into £750,000 New Consolidated Debt, interest at the rate of 4½ per cent for five years, 4¾ per cent for the second five years, and 5 per cent thereafter.

On October 27, 1897, arrangements were made between the holders of the Consolidated Debt and the owners of the then newly formed

Guayaquil & Quito Railway (see "Railways") whereby the bondholders would receive $175 in new 6 per cent first mortgage bonds of the railway, carrying interest from January 1, 1898, and a bonus of £2 10s. in exchange for each £100 of Consolidated Bonds of the Government. The company subsequently delivered to the bondholders $1,014,000 railway bonds. The Government in 1898 agreed to recognize the Consolidated Bonds acquired by the Guayaquil & Quito Railway at 35 per cent of their par value, to pay 4 per cent per annum interest and 1 per cent sinking fund on the recognized amount, and to hand over to the company the sum of £33,950 10s. in cash, this being equal to the cash paid by the railway to the former bondholders in carrying through the transaction.

Further events in connection with the above transaction will be discussed in the section on "Railways."

In 1904 the Government of Ecuador delivered to the Guayaquil & Quito Railway, in return for the delivery of the former Consolidated Bonds, "Condores Bonds" to the amount of £77,900. The original issue of these bonds had been £83,400, of which £5,500 had been paid off through a sinking fund. The interest rate is 4 per cent and the sinking fund 1 per cent per annum, and they are secured on a portion of the customs receipts. The interest payments were made until July, 1911, with some delay, the coupon for the latter date having been paid in March, 1914. Bonds to the amount of £71,700 remain outstanding, and their original offering price was said to have been 68. The bonds have not been widely distributed.

In accordance with an arrangement made in September, 1908, between the Government of Ecuador, the Guayaquil & Quito Railway, and the Council of Foreign Bondholders, London, representing the bondholders, an issue of $1,185,380 4 per cent salt bonds of the Government was created for the purpose of funding the coupons due January and July, 1908, and January, 1909; $1,075,050 of these bonds, par value $90 United States currency, were issued, interest January and July, to be paid off by means of a cumulative sinking fund of 4 per cent per annum up to par. The bonds were to be secured on the entire proceeds of the sale of salt, a Government monopoly. Interest and a large part of the sinking fund were paid until the outbreak of the European war. Bonds to the amount of $636,480 rêmain outstanding. The quotation in January, 1918, was 45½, as compared with the high and low prices since 1911 of 78¾ and 38, respectively.

In December, 1910, the Government of Ecuador contracted a loan with Speyer & Co., of New York, for £300,000, secured by 6 per cent treasury certificates. This loan was fully paid off in 1913.

PROVINCIAL AND MUNICIPAL FINANCES.

There are no provincial loans authorized or outstanding in Ecuador. The Provinces have not the right to negotiate loans except only as advances of taxes to be collected. The municipalities owe but little, such debts being mostly of a floating character. The municipality of Quito has been authorized to create a loan for public works, a portion of which has been secured from the local banks. Guayaquil has also borrowed some funds and is said to have a moderate floating indebtedness.

BANKS.

There are in Ecuador four principal banks of issue, two mortgage banks, and two mixed banks. These banks will be briefly reviewed:

The Bank of Ecuador (Banco del Ecuador), the head office of which is at Guayaquil, is capitalized at 3,000,000 sucres. Its bank-note issue totals $1,223,554.

The Commercial and Agricultural Bank (Banco Comercial y Agrícola), the largest bank in the Republic, is capitalized at 5,000,000 sucres and has a bank-note issue of $2,996,385. The head office of this bank is at Guayaquil.

The Banco de Pichincha is located in Quito, the capital. It has 1,500,000 stock outstanding, a large proportion of which is owned by the Ecuadorian Corporation (see "Public utilities"). The bank-note issue amounts to $890,965.

El Banco del Azuay, capitalized at 400,000 sucres, is located in Cuenca. This city, located about 70 miles southeast of Guayaquil, is of some commercial importance, although it is a considerable distance away from any railway. The town has a population of about 30,000, mostly of the Indian race.

Other banks of importance are the Banco de Crédito Hipotecario, a mortgage bank, capitalized at 1,000,000 sucres; the Banco Territorial, at Guayaquil, capitalized at 1,000,000 sucres, also a mortgage bank; and the Compañía de Crédito Agrícola e Industrial (capital 1,000,000 sucres), which operates a mortgage and savings bank.

RAILWAYS.

GUAYAQUIL & QUITO RAILWAY.

There is only one important railway in Ecuador—namely, the line extending from the port of Guayaquil to Quito, the capital. Although this project is a very old one, dating back perhaps more than half a century, the two cities were not placed in rail communication until 1908.

The starting point of the Guayaquil & Quito Railway is at Duran, a town of moderate importance located opposite Guayaquil on the banks of the Guayas River. The river at this point is about three-quarters of a mile wide, and passengers are ferried across by steam ferryboats owned by the railway company. At Guayaquil a wharf of sufficient size to take care of traffic is owned by the railway company, while at Duran are located shops, warehouses, and the offices of the company. The length of the line is 290 miles and the gauge 3 feet 6 inches. The highest altitude reached is 11,841 feet, at Urbina, between Riobamba and Ambato.

The country between Guayaquil and the edge of the mountain slope is cultivated with cacao, sugar cane, coffee, and other products of the Tropics, and this section of the line furnishes a very large proportion of the total traffic handled. About 58 miles from Guayaquil the climb into the sierra begins, and the trains from this point are shorter and are handled by heavier locomotives. The railway after a short climb enters the Chan-Chan Valley, which is followed along a route laid out under great engineering difficulties. The curves on this section are extremely wide and numerous, and the grade reaches 4½ per cent. The railway, in a general way, is laid out along the route of a torrential river, which is crossed and recrossed at various points. At an approximate altitude of 4,000 feet the city of Huigra is reached; from this point a rugged, broken country is entered, and wonderful engineering feats had to be performed in making the climb up the Andean slopes. Along this section of the railway is located the "Devil's Nose," where the line enters a deep gorge. In this gorge the line comes to an abrupt end, and the trains have to be backed up over a switch along a ledge blasted out of the face of the precipice. By this means a higher ledge is reached and forward progress is again possible. The "Alausi Loop," at an altitude of 8,553 feet, is another splendid engineering feat. The road then climbs to the Palmira Pass, 10,600 feet above the sea. Then there is a slight descent to Riobamba, one of the largest towns in Ecuador, located at an altitude of 9,020 feet. There is another heavy climb from that place to the Chimborazo Pass, the altitude of 11,841 feet being the highest point reached on the entire line. The railway then drops to Ambato, 8,435 feet, located in the center of a well-cultivated district, reclimbs to the base of Mount Cotopaxi, 11,653 feet, and enters the Machachi Valley, reaching Quito at 9,375 feet elevation.

The financial problems of this railway have been numerous. The construction of the system was extremely costly, and earnings never came up to expectations. Its financial history has been partly reviewed in the section devoted to Government loans. The outstanding securities of the railway company are as follows:

(*a*) Common stock, $7,032,000, par value $100, of which $3,445,700 was issued to the Ecuadorian Government in part payment for the concession. No dividends have ever been paid. The Government appoints two directors and the majority stockholders six directors. In addition to the outstanding common stock, as above, $1,000 special voting stock is held by the Council of Foreign Bondholders, of London, this stock carrying the right to elect three directors.

(*b*) Seven per cent cumulative preferred stock, par $100; $5,250,000 outstanding. No dividends have ever been paid.

(*c*) Five per cent first mortgage bonds ($10,813,000). These bonds were originally issued as 6 per cent bonds and were guaranteed as to principal and interest by the Government of Ecuador. They were secured by a first lien on the customs revenue, as well as by a first mortgage on the railway. In 1908 the rate was reduced to 5 per cent per annum and the bonds were made subject to the 6 per cent prior lien bonds (see next paragraph). The interest dates are January and July, and there is a 1 per cent sinking fund which purchases bonds below par or draws them at the latter figure. The July, 1910, coupon was paid in January, 1913; the January, 1911, coupon in May, 1913; the July, 1911, coupon in September, 1913; the January and July, 1912, coupons in December, 1913, and March, 1914; no coupons were paid during 1915 and 1916. These bonds were quoted at 31 in January, 1918, as compared with the high price of 66 since 1911.

(*d*) Six per cent prior lien mortgage gold bonds; $1,000 denominations; $2,486,000 issued and $1,975,000 outstanding; interest January and July. Coupon payments have been regularly made, although sometimes with slight delay. Sinking-fund payments of 2½ per cent per annum were made regularly until December 31, 1914, and the final maturity date for the bonds is January 2, 1930. The issue is secured by a prior charge on the property. These bonds were quoted at 71 in January, 1918, as compared with the high price of 92 since 1911.

The earnings of the Guayaquil & Quito Railway during the past several years have been as follows:

Years.	Passenger earnings.	Freight earnings.	Miscellaneous.	Operating expenses.	Deficit.
1913	$308,678	$689,155	$13,891	$1,236,771	$225,047
1914	297,966	709,134	10,712	1,084,007	66,195
1915[a]	303,658	705,359	16,799	1,091,696	65,881
1915[b]	362,205	645,627	28,402	1,099,313	63,079

[a] Year ended June 30, 1915.

[b] Year ended Dec. 31, 1915.

The bonds of the company are listed on the London Stock Exchange; the stocks of the company are not quoted.

OTHER RAILWAYS IN THE REPUBLIC.

Such other railways as exist in the Republic of Ecuador are not important. The Central Railway of Ecuador, a British company, was registered in 1910 to acquire a concession granted in 1909 for the construction of a railway from the Port of Manta to Santa Ana, about 35 miles, together with a wharf at Manta. The capitalization of this company consists of (1) £100,000 stock, on which no dividends have been paid; (2) £100,000 6 per cent guaranteed prior lien bonds, secured by a first charge on the property and concession; (3) £42,500 6 per cent income bonds, issued in exchange for former first mortgage bonds on the basis of one new bond for four old bonds. The original 6 per cent bonds of the company were offered in Paris at 97 per cent, and certain export duties were assigned for their service. No interest has ever been paid on the prior lien bonds, and no statements of earnings have been made public for some years. The line is equipped with American locomotives and cars.

Another company, the Compagnie Française de Chemins de Fer de l'Equator (Bahia de Caraquez to Quito Railway), was formed in 1909, to construct a railway from the port of Bahia de Caraquez to Quito, 185 miles. A bar across the mouth of Caraquez Bay, on which the port is located, closes it for large vessels. This bar was to have been dredged, and it was expected that the harbor, owing to its location, would become important. In June, 1909, the company offered through the Banque Commerciale et Industrielle, of Paris, 7,000,000 francs bonds at 84½. The bonds bore interest at the rate of 5 per cent per annum and were to have been redeemed by a sinking fund of one-half of 1 per cent per annum. They were secured by a portion of the customs receipts of the Province of Manabi, and the Government of Ecuador proposed to guarantee 6 per cent interest on the cost of construction up to 25,000,000 francs, in so far as the net receipts of the line are not sufficient to cover this in proportion as each section costing at least 200,000 francs is opened for traffic.

Some progress was made on the construction of this railway, but owing to the war and other reasons many delays were occasioned. Earnings of the unfinished sections have not been large, and the roadway and equipment have not been maintained up to standard. Early in 1917 it was stated that the company would abandon operations and that the railway would be taken over by the Government. The Government is making certain improvements and hopes to continue the construction of the railway as soon as conditions are favorable.

There are a number of other railway undertakings partly constructed, surveyed, or projected. Work has been under way on a line to extend from Guayaquil westward to the oil fields in the Peninsula of Santa Elena, terminating at the small port of Ballenita. A short railway runs from Puerto Bolivar, near the Peruvian boundary, inland for a few miles, reaching some cacao lands. In time this line will probably be extended westward to the town of Jiron and thence northward to Cuenca. A projected line that may in time be carried forward will extend, it is hoped, from Ambato, a station on the Guayaquil & Quito Railway, eastward down the Andean slope to San Antonio on the Cururay River. This river is a tributary of the Napo, one of the feeders of the Amazon. The railway will extend, in part, through a wilderness now inhabited only by wild Indian tribes, and will provide an outlet for the forest products of the Oriente. About 25 miles of track have been laid.

The present railway mileage of Ecuador is about 400.

PUBLIC UTILITIES.

Public-utility development in Ecuador has been relatively unimportant. In Quito there is an electric tramway line, installed by J. G. White & Co. This, together with the Quito Electric Lighting & Power Co., which furnishes light and power to the city, is owned by the Ecuadorian Corporation, a British company, incorporated in 1913 with a capitalization of £307,783 shares (£500,000 authorized) and £322,500 6 per cent first debentures (£500,000 authorized). The Ecuadorian Corporation also owns water power rights near Quito, the Inca Springs Co., an interest in the Banco del Pichincha at Quito, lands at Quito and Duran, etc. This company met with temporary financial difficulties during the early days of the European war owing to adverse exchange conditions, but its position has since improved and the interest due April 15, 1915, and all subsequent coupons have been duly paid at maturity.

There are two street-car lines in Guayaquil, as well as electric lighting and gas plants. The water supply of the city is brought through mains from a point in the mountains some 53 miles away. All the public utilities of this city might readily be improved. There are one or two mule tramway lines in the interior, small electric lighting plants have been established in a few of the cities, and there are some opportunities for the extension of this service. Water service is far below the needs of the people, and sewerage systems are needed in almost every city.

At the close of the year 1915 there were 2,926 telephone instruments installed in Ecuador, mostly in Guayaquil, the leading company in the field being the National Telephone Co., capitalized at $125,000 (increased in 1914 from $50,000). The total capital invested in the telephone systems of the Republic is said to be $181,687. There are approximately 5,400 miles of telegraph, and upward of 400,000 messages are handled annually.

MINING AND PETROLEUM ENTERPRISES.

Ecuador has been the least fortunate among the Andean Republics in mineral resources. Gold seems to be the only mineral of commercial importance at the present time, although copper, quicksilver, iron, lead, and platinum all exist in unknown quantities. Petroleum has also been located and will be discussed in subsequent paragraphs.

The Zaruma mines, in Southern Ecuador, have long been known to the outside world. They were first known to the Spaniards in 1549, since which time they have been worked in a haphazard, spasmodic manner. During the early part of the nineteenth century a large population was supported by the mines. In the latter years the gold production decreased and the importance of the industry steadily declined. English and French companies have in later years worked important mines in the district, including the Compañía Mineral Nacional Felix, formed in France in 1889 and the Zaruma Gold Mining Co., of Great Britain, formed in 1880, with a capitalization of £250,000. The Compañía Exploradora was also a factor in the field. The Zaruma company met with financial difficulties and has since been reorganized. The present Zaruma Mining Corporation was registered in 1913 with a capitalization of £110,000 preferred and £10,000 deferred stock. At last accounts 1,838 acres were held and the stock was owned by French and British interests. The mine is presumably idle. The South American Development Co. seems at the present time to be the only company carrying on any mining operations.

There are copper deposits in the Department of Loja. A little mining has been carried on without success. While there is every reason to believe that the great Andean regions of the country contain considerable copper, little exploration work has been carried on.

Because of the successful development of petroleum-bearing zones in Peru and the fact that oil deposits are known to exist in Colombia and Venezuela, attention has been directed to Ecuador. Bituminous seams in which fair quantities of petroleum have been found to exist have been variously located in the northern portions of the Republic. In El Oro also, not far from the boundary with Peru, oil has been located, this field holding very good prospects, it is claimed. Santa Rosa is the town nearest to this prospective petroleum field.

The principal oil deposits thus far located in Ecuador lie about 90 miles southwest of Guayaquil and are not more than 750 miles from Panama, being near the minor port of Santa Elena, in desert country. They are reached from Guayaquil by means of a fairly good automobile road and have telephone and telegraph connections with that city. The surface of the country is said to be fairly level, inclining slightly toward the sea. "In this district," says the South American Journal, "the layer containing the petroleum, known by its black color, is blue shale of unknown thickness, superficial at some points, and elsewhere covered with marine débris; is very spongy and rests on a base of impermeable sandstone, which prevents much filtration, although it is impregnated with oil. It is nearly horizontal, of variable thickness, about 3 feet in the center, and covers an area extending 6 miles north and south and about 20 miles inland. The presence of a small oil fountain, together with considerable gas, would indicate that deep drilling would produce flowing wells."

At the present time the method employed in collecting the petroleum, about 25,000 barrels of which are secured annually, is to dig small holes to a depth of not more than 50 feet down to the impermeable sandstone. The life of these "wells" is anywhere from three months to three years.

In 1910 a well was sunk to the depth of about 150 feet and in 1913 another to a similar depth, both passing through small veins of oil and gas. A third well of 1,250 feet was to have been sunk, but work was discontinued at about the time of the outbreak of the European war, owing to lack of available capital. The deposits seem to be similar to those of the Lobitos and Negritos fields of Peru, which yield successfully at a depth of about 1,000 feet and which have been steady large producers for many years. It was stated in 1916 that drilling in the Ecuadorian field at that time cost approximately (including casing) $7.75 per foot to 1,500 feet and slightly less than $10 per foot after that depth is reached. Native labor receives from 60 to 75 cents gold per day. Mechanics are obtainable only with difficulty.

The Ecuadorian petroleum is certain to find a ready market in Guayaquil and elsewhere throughout the Republic. Already the Guayaquil electric lighting plant, the local brewery, and the gas works are using it, and the Guayaquil & Quito Railway has converted a number of its locomotives into oil burners. Local river boats and a number of the small industrial plants of the country would doubtless use it if obtainable, particularly since the price of coal has soared to record heights. A small refinery was attempted at Santa Elena, but the enterprise did not prove successful. A plant exists that treats small quantities of the oil for asphalt.

Most of the oil concessions are held by Ecuadorians. However, in 1910, an Anglo-French company known as the Ancon Oil Co., with £250,000 authorized capitalization, of which £81,060 has been subscribed and fully paid up, was incorporated to acquire five oil claims of 800 acres each. The well on the Ancon property has been sunk to the depth of approximately 2,180 feet, and an agreement has been entered into with another company, the Ecuador Drilling Co., for assistance in carrying on the work.

AGRICULTURE.

The leading product of the Republic is cacao, the Ecuadorian cacao ranking second to none in quality. The cacao industry employs directly or indirectly a relatively large proportion of the population, and a number of joint-stock companies have from time to time been formed to carry on the raising of the product on an extensive scale. Two of the largest companies are German, working the Seminario, Puga, and Clementina Estates. Some of the plantations are under

British control, and the remainder are, for the most part, locally owned. It is estimated that an area of 100 square yards will accommodate more than 1,300 trees and will yield under normal conditions more than 1,000 pounds of cacao. Three or four years ago it was calculated that a season's crop would return a profit of about 12 per cent on the investment. At present prices the profit varies from 15 to 25 per cent.

Rice and maize may be readily produced, but no great headway has been made in cultivating these products. Plantation rubber is being raised in small quantities; the soil and climate are highly favorable to its cultivation. The tagua or ivory nut was exported rather extensively before the European war, and a moderate demand exists for the product at the present time. Sugar, bananas, oranges, and other products are cultivated. The oranges might readily be shipped to Panama and elsewhere were it not for the unfavorable freight rates, the quality raised being excellent. Enough tobacco is grown for home needs, and a large number of coconuts are gathered in the coastal lowlands.

Although there are considerable areas that might be used for pastoral purposes, the development in this field has been comparatively slow. A small number of horses and mules are exported, as well as some hides. Practically all of the wool clip and meat supply are consumed in the country.

FOREST RESOURCES.

One might write an elaborate essay concerning the vast forest wealth of eastern Ecuador. C. Reginald Enock, a well-known traveler in South America, in his book "Ecuador" (Scribner's South American Series) describes the country lying to the east of the Andes: "It is majestic in certain aspects, but becomes at times melancholy, sombre, and oppressive. There is no horizon. The view is everywhere barred by trees, whose green walls inclose the channels of the rivers to the very verge." These forests contain many varieties of hardwood trees and practically every known form of forest wealth. There are numerous rivers in the eastern section of the Republic, all of which flow in a general easterly direction. Almost no means of communication exist between the forest country and the Andean plateau, and the development of the timber and hardwood resources awaits the coming of better transportation facilities.

MANUFACTURING.

One need scarcely say that the industrial development of Ecuador has been decidedly restricted. There are a few factories and manufacturing plants in the Republic, mostly in Guayaquil. These include the national shoe factory, capitalized at $200,000 and employing about 100 persons; 7 flour mills; 6 cotton and woolen mills; 11 breweries, 7 of which are located in Quito; 3 tanneries; 24 ice plants; a few small boat and ship building plants; an iron foundry; machine shops; chocolate and candy factories; sawmills; furniture factories, etc. The Panama hat industry is, of course, extremely important.

THE GUIANAS.

BRITISH GUIANA.

INTRODUCTION.

Great Britain's only colony on the continent of South America, British Guiana or Demerara, is bounded on the northwest by Venezuela, on the east by Dutch Guiana, and on the south and southwest by Brazil. At the source of the Essequibo River the colony is within two-thirds of one degree (north latitude) of the equator. Its area is 90,277 square miles, exceeding that of England, Scotland, and Wales combined. Its seacoast covers 270 miles, and its depth varies from 300 to about 535 miles. The coastal lands are extremely flat, the country sloping gradually as the interior is reached. The estimated population of British Guiana is 300,000.

British Guiana is a land of many rivers, some navigable and important. The Demerara River, though not the largest, is by far the most important, since Georgetown, the capital and principal town (population 65,000), is located at its mouth. There are about 58,000,000 acres of land in the colony, of which only about 2,000,000 acres are owned privately. About 11,000,000 acres of the land are located in the accessible lowlands. At present practically the whole population lives in the coastal belt. Many of the sugar plantations are located close to the sea and have been compelled to put up extensive dykes for protection against the inroads of the waves. Similar conditions exist among many of the river plantations. The average annual rainfall at Georgetown is 93 inches.

In the highlands there is a great area of prairie land known as the Rupununi Savannah, said to be magnificent cattle country and suitable also for the raising of cotton and tobacco. There is sufficient water supply in the district, which is, however, rather difficult of access owing to the lack of a railway to the interior. The various resources of this and other sections of the colony will be discussed in later paragraphs.

Georgetown contains 50 miles of paved streets and covers an area of more than 1,300 acres. An excellent system of tramways operated by the Demerara Electric Co. furnish local transportation. This company also provides electric lighting.

BONDED DEBT—FINANCES.

The public debt of British Guiana amounts to approximately £3 per head of population. There are only two important external issues, both mostly held in London and listed on the London Stock Exchange. One of these issues bears interest at 4 per cent per annum and the other at 3 per cent. These issues are as follows:

Four per cent inscribed stock, redeemable 1935, authorized and outstanding £194,500, interest January and July 15. The closing

price of this issue July 27, 1914, was 99 and the price January, 1918, about 80.

Three per cent inscribed stock, redeemable 1923 to 1945, interest February and August, authorized and outstanding £250,000. The closing price of this issue July 27, 1914, was 77 and the price January, 1918, about 61.

No British stamp-duty taxes are payable on the two issues.

The revenues and expenditures of the colony generally about balance. In recent years they have averaged approximately £550,000 per annum; resources and sources of revenue are sufficiently large to assure the maintenance of the interest and sinking fund on all outstanding issues of bonds.

BANKING AND INSURANCE.

The banking facilities of British Guiana are amply provided by the Colonial Bank, the Royal Bank of Canada, and various private interests. A large amount of insurance business is handled by the Demerara Mutual Insurance Co., which also maintains agencies throughout the West Indies.

RAILWAY DEVELOPMENT.

There are two railway lines operating in British Guiana, the most important of which is the Demerara Railway, operating 79 miles of road. The main line is of 4-foot 8½-inch gauge; this line is 60 miles in length, its track extending from Georgetown eastward along the coast to a point opposite New Amsterdam (Berbice), the second city in importance. There is another 19-mile line that runs from Vreeden-Hoop on the Demerara River to Greenwich Park on the Atlantic Ocean, this line having a gauge of 3 feet 6 inches. The original prospectus of the Demerara Railway was issued in 1845, when subscription was invited for 10,000 shares of £25 stock, payable in installments. The proceeds were to be used to construct a line 20 miles in length from Georgetown easterly to Mahaica. The company was incorporated October 30, 1846, and grading was commenced several months later. The concern had been floated during a great railway boom in England and elsewhere, and, as this boom collapsed very shortly after construction work on this line was begun, many of the shareholders who had made investments in shares of other railway companies found themselves embarrassed to such an extent that they were unable to continue installment payments on their Demerara Railway shares. The assistance of the colonial government alone saved the situation through advances made to the company; however, funds raised were only sufficient to complete 5 miles of road from Georgetown to Plaisance. This short line was opened for traffic in the year 1848 and is actually the oldest railway in South America.

Construction work was resumed prior to the year 1851, and the extending of the line was slowly continued, Mahaica being reached in 1864. In 1899 this line was continued to Rossignol, opposite New Amsterdam, which latter city, as stated, is the second place of importance in the colony. The other section of the railway, known as the West Coast Line, was also completed in 1899, with the exception of 4 miles, recently completed. It is contemplated that at some future date the railway will be extended from New Amsterdam to the boundary with Dutch Guiana.

Sprostons (Ltd.), a large joint-stock corporation operating in the colony, has constructed a railway from Wismar on the Demerara River, some 65 miles above its mouth, to Rockstone, on the Essequibo River (18¾ miles). This line is of meter gauge and was built to provide a means of access to the upper Essequibo River, avoiding extensive and dangerous rapids, and to the Potaro and other gold fields. The little railway runs through a primeval forest and handles, in addition to the passenger traffic (including in normal times a certain amount of tourist traffic), a fair quantity of greenheart and other varieties of timber. Sprostons (Ltd.) is one of the largest companies in the Guianas, employing normally more than 1,000 hands. The concern owns a foundry, woodworking mill, ship-repair yard, lumber yard, the railway just described, and a number of steamers, launches, etc., maintaining service along the coast and in the various rivers.

The construction of a railway inland to the boundaries of Brazil has long been contemplated and would prove an invaluable means of developing the interior of the colony. As has been pointed out, there are resources of considerable value in the regions above the navigable points in the rivers, and a fair amount of traffic might be developed.

Returning to a discussion of the Demerara Railway, it may be stated that the capitalization consists of £70,000 4 per cent debenture stock (issued in 1901); £115,000 7 per cent perpetual cumulative preference stock, which was issued in the year 1861 (dividends have been regularly maintained on this class of stock, except for one period of four years, for which the accumulated dividends were subsequently paid off in 3½ per cent preferred ordinary stock, issued to the amount of £32,200); £312,500 4 per cent extension preference stock, issued in 1896, the dividend on which (£12,500 per annum) is equal to the amount received annually from the government as a subsidy following the construction of certain extensions; and £165,000 ordinary stock, which usually received dividends at the rate of 3 per cent per annum until April, 1912, when, owing to a drought, the dividend was omitted and was not resumed until 1917, when 4 per cent was paid. Gross receipts during recent years have been as follows (not including annual government subsidy of £12,500 per annum): 1908–9, £55,593; 1909–10, £52,091; 1910–11, £50,461; 1911–12, £49,713; 1912–13, £47,501; 1913–14, £51,881; 1914–15, £53,791. For the six months ended December 31, 1916, earnings amounted to £33,713, as compared with £29,489 in 1915, and a total of £10,641 remained available for dividends. Quotations on the various classes of debentures and stocks have been as follows:

Securities.	High price since January, 1911.	Price July 27, 1914.	Price January 1918.
4 per cent debenture stock	96	89½	71
7 per cent cumulative preference stock	119	106½	100
4 per cent extension stock	94	82½	67
Ordinary stock	47	....	36

There is no market on the London Stock Exchange for the 3½ per cent preferred ordinary stock, which, however, is worth not far from 50. This and the various other classes of stock are held partly in Great Britain and partly in the colony. It was indicated in the last-issued semiannual report that sufficient was earned to warrant the resumption of dividends on the ordinary stock, but that owing to needed improvements dividends would have to be deferred for a short period. Prospects for the year 1917 were said to be most excellent for the company. The business handled during the second half of 1916 consisted of 330,386 passengers and 52,752 tons of freight.

PUBLIC UTILITIES.

The only important company in the public-utility field is the Demerara Electric Co. (Ltd.), a Canadian corporation with head office at Halifax, Nova Scotia, which holds a concession granted by the colonial government to furnish electric light and power and to operate a traction line, about 18 miles, in the city of Georgetown.

The Demerara Electric Co. was incorporated in 1899, in British Guiana, as successor to the British Guiana Lighting & Power Co. and the Georgetown Tramway Co. (Ltd.). The company does all of the electric lighting and traction business in Georgetown and in other places in the colony. The electric license is perpetual, but may be revoked at any time with the consent of the company. The tramway license is for 30 years, with a 20-year renewal privilege.

The capitalization of the company consists of $425,000 common stock and $500,000 first-mortgage 5 per cent gold bonds due 1929, interest (January and July) payable at the National Trust Co., Montreal, Canada. A small issue (approximately $60,500) of 7 per cent notes was outstanding in 1917.

The company's reports for four recent years indicated the following results:

Items.	1913	1914	1915	1916
Gross earnings	$143,616	$141,237	$135,325	$135,978
Net earnings	57,156	56,706	48,143	45,270
Fixed charges	38,715	38,751	38,568	29,031
Surplus	18,441	17,955	9,575	16,239
Dividends	18,062	17,000	8,500	....
Passengers carried [1]	1,501,882	1,458,578	1,301,687	1,279,618

[1] Not including transfer passengers; total including transfer passengers in 1916, 1,769,024. Lights in service (incandescent) December 31, 1916, 14,221; municipal lamps, 149; arc lamps and clusters, 218; stationary motors, 146.

The dividend rates have been as follows: 1904 to March, 1910, 1¼ per cent per annum; 1910 to 1913, 5 per cent; October, 1913, to July, 1915, 4 per cent; no dividends during 1916.

As already mentioned, the general offices of this company are at Halifax, Nova Scotia. The control of the company is held by interests similarly controlling the Trinidad Electric Co., operating tramways and electric lighting in the colony of Trinidad.

MINING ENTERPRISES.

The mineral wealth of British Guiana is largely confined to gold and diamonds, although bauxite has recently been found in what promises to be paying quantities. Operations in gold mining were carried on as early as the sixteenth century and were prosecuted almost continuously during the seventeenth and eighteenth centuries. In the nineteenth century a new discovery of gold was made during the year 1849, just at the commencement of the gold rush to California; this led to the creation of a considerable amount of interest and much prospecting was carried on, with little result, however.

In the year 1857 mining was actively begun in the Yuruan district. Among other finds a nugget of 180 ounces was obtained. A few years later a further find was made along the Cuyuni River. A local company was formed to develop the mine extensively, but little profit resulted. In 1876 the discovery of gold in Dutch Guiana led to a temporary rush to that colony. This was followed by awakened interest in the British Guiana gold fields, and in 1883 it was recorded that mining was being carried on in the interior with success. By 1885 the industry had assumed considerable importance, and much excitement was created by the finding of 275 pounds of gold by an American prospector, Ferdinand Jacob by name. Shares of a company whose property was located at Himarracke, district of Mazaruni, with a par value of $5, rose to $37.10. Later a nugget weighing 333 ounces was discovered at Barima, its value exceeding $6,500.

During recent years a considerable amount of dredging has been carried on with fair success. However, most of the gold taken out has been from alluvial diggings, a very large proportion of the diggers being negroes. During the 25 years to and including 1913 a total of 2,287,234 ounces had been mined, the 1913 output of 62,098 ounces being obtained from 10 different river districts. Several good finds have been made during recent years, including an important one in 1913 near Pigeon Island on the Cuyani River. The mining districts are mostly difficult of access, and for that reason scientific mining with modern machinery is almost impossible under present conditions. When railway communications are established with the interior these conditions will be much improved.

The gold production of British Guiana during recent years has been as follows: 1908, 65,717 ounces; 1909, 74,001 ounces; 1910, 63,231 ounces; 1911, 55,543 ounces; 1912, 51,196 ounces; 1913, 62,098 ounces; 1914, 63,801 ounces; 1915, 53,907 ounces. Since 1890 the value of the gold production has exceeded $40,000,000.

British Guiana produces a large number of diamonds, mostly of a small size, however. For the 13 years ended March 31, 1913, a total of 1,130,494 stones, weighing 85,809 carats, were produced. In 1913 the production totaled 75,479 stones, weighing 7,578 carats; in 1914 the production was 9,705 carats, valued at $87,200, and in 1915 the production was 6,203 carats, valued at $51,390.

On a number of occasions the discovery of oil has been rumored. The most favorable indications seem to be in the Waini River district. Asphalt has been located near the Atlantic coast, but is not worked.

TIMBER RESOURCES.

Of the area of British Guiana it is estimated that nearly five-sixths is covered with forests, practically all the property of the government. Most of this 78,500 square miles of timber lands is inaccessible, owing to the numerous waterfalls and rapids in the rivers. This vast region can only be developed following the establishment of a railway line from the coast or head of river navigation to the far interior. The exports of this timber have not thus far assumed very large proportions, totaling 437,111 cubic feet of timber and 517,919 cubic feet of lumber in 1913 and less than half that amount in 1915. An increasing trade in shingles is developing.

In the forest areas trees of many varieties are found, sometimes 40 to 60 varieties to the acre being noted. British Guiana greenheart, a wood of great strength, exists in large quantities and is being sought for to an increasing extent, owing to its usefulness in the construction of docks, heavy floorings, and for many other purposes. A large portion of the greenheart timber is shipped to Panama.

LIVE STOCK.

There are at present about 100,000 head of cattle in British Guiana and about 10,000 horses, mules, and donkeys. A number of cattle ranches have been established in the interior in the savannas of Rupununi and Takutu, and more than 10,000 cattle are stocked on them. These lands are rented from the Crown at a nominal rental, and, as has been stated elsewhere, are excellently suited for the industry. The development of the cattle industry in the interior, however, awaits the coming of the railway.

SUGAR.

Sugar has long been the principal source of revenue to British Guiana and in the early years of the colony brought great wealth to the owners of the various estates. In the long period of low prices the production declined seriously, and only recently has a revival been noted. It is stated that in the year 1837 there were no fewer than 200 estates, covering upward of 75,000 acres. To-day many of the estates have consolidated and the number has considerably decreased. The production from 1881 to 1885, inclusive, amounted to £12,038,699; from 1886 to 1890, £9,305,880; from 1891 to 1895, £8,276,916. In 1913 the exports of sugar consisted of 174,828,000 pounds, in addition to 118,699 gallons of molasses and 3,253,653 proof gallons of rum. In 1914 and 1915 the amount of sugar exported was 107,138 tons and 116,224 tons, respectively, and the amounts of rum exported totaled 3,489,729 gallons and 4,698,230 gallons.

The sugar lands of British Guiana are mostly situated in the coastal lowlands, and the area under cultivation for cane on September 30, 1916, totaled 77,167 acres. In his annual report for 1915 United States Consul George E. Chamberlin stated, as an example of the increased values and profits in the sugar industry of the colony, that an estate which in 1913 was sold for $20,000 was resold to a local syndicate late in November, 1915, at $150,000, and that during the two-year period the profits on the output of sugar had been $125,000. The profits in sugar during 1916, although not yet fully enumerated, have been the largest since the early days of the colony, with the result that extraordinary prosperity is being enjoyed. The value of the 1915 crop exported or consumed at home, including rum and other products, was nearly $13,000,000—a figure $3,500,000 in excess of 1914 and $6,000,000 in excess of 1913. The 1916 crop probably realized more than $15,000,000.

RICE.

The raising of rice has become an important and profitable industry in British Guiana, whose lowlands are very well fitted for its growth. The large East Indian population of British Gûiana are extensive users of the product, and a good market is likewise enjoyed in Barbados, Trinidad, and other West Indian islands. Demerara rice is of an excellent variety. Formerly 39,000,000 pounds of rice were imported annually, whereas to-day practically none is imported. The production in 1916 was approximately 70,000,000 pounds, and the amount exported was 29,139,265 pounds, as compared with 20,289,568 pounds in 1915 and 15,880,941 pounds in 1914. Probably the largest producer of rice in the colony is the Abery estate, operated by an American company. The rice exported from the entire colony during 1916 was valued at $1,043,502.

COCONUTS, CACAO, ETC.

Increasing attention has in late years been given to the raising of coconuts, and fully 17,000 acres of trees have been planted. In 1915, 2,090,083 nuts and 181,339 pounds of copra were exported, as compared with 1,889,921 nuts and 183,354 pounds of copra in 1914. A considerable amount of coconut oil was also exported during 1915, the total value of all coconut products shipped being in excess of $45,000. When all of the area planted with coconut trees comes into bearing the production will increase to many times the present amount. British Guiana, not being subjected to severe hurricanes, is particularly suited for the growth of the nuts.

Cacao is being grown in increasing quantities but is not yet an important article of export. In 1916 the cacao shipped abroad was valued at only $6,055, as compared with $8,508 the year before. During three recent years Dutch Guiana exported cacao valued at more than $1,200,000, mostly to the United States.

Coffee of a good quality is also being raised in small though increasing quantities. In 1913 the exports of coffee were about 89,300 pounds; in 1914 the amount was 239,000 pounds; while in 1915 there was a slight setback, the quantity exported being 172,326 pounds. Limes are also being grown, and a small, though increasing, amount of citrate of lime is being shipped from the colony.

RUBBER AND BALATA INDUSTRIES.

Rubber planting has of late attracted much attention in the colony, and much is expected from its development. Upward of 6,000 acres have been planted with rubber trees and doubtless the area will be vastly extended. Very little rubber has as yet been exported.

Balata is the fourth most important product of British Guiana, the annual value of the product being exceeded only by sugar, rum, and gold. The exports during 1915 realized $848,541, as compared with $784,089 in 1915. The shipments in the former year were the largest in the history of the colony: Several important British companies are interested in the industry.

TOTAL TRADE.

The total import and export trade of British Guiana during the year 1916 amounted to $28,548,647, of which $18,038,716 represented exports and $10,509,931 imports. The total foreign trade for 1915 was $24,810,668.

DUTCH GUIANA.

INTRODUCTION.

Dutch Guiana, or Surinam as it is sometimes called, is situated between British and French Guiana, being bounded on the north by the Atlantic Ocean. The colony's area is about equal to New York State, and its population is about 87,000, of whom a vast majority are colored. Paramaribo, the capital, contains about one-half of the population and is the only town of commercial importance. About 65,000 acres of land are under cultivation, a vast proportion of the country being covered by forests. The colony, for many reasons, has not progressed to any considerable extent during recent years, although the recent rise in the price of sugar has somewhat improved conditions.

TRANSPORTATION CONDITIONS.

There are stated to be about 109 miles of railway in Dutch Guiana, the only important line extending from Paramaribo to Macami, a gold-shipping point on the Surinam River. Only one passenger train a week was operated at last accounts, the railway passing through a poor and thinly settled territory. During a recent year gross earnings were stated to amount to about $54,000, about one-half of operating expenses. There are a number of rivers, some of which are navigable for heavy-draft steamers for a short distance. Beyond the tide limit, however, these steamers are wholly dependent on the rather uncertain rainfall of the interior. Lack of transportation greatly hampers the development of the entire country.

AGRICULTURE AND RELATED INDUSTRIES.

Sugar, in the days of slavery, was a source of great wealth to Dutch Guiana. It is recorded that in the year 1683 there were 50 sugar plantations, and 50 years later 400 sugar plantations. In 1760, 21,000,000 pounds of sugar were exported and in 1800, 26,000,000 pounds. Following the abolition of slavery the industry rapidly declined in importance. To-day there are probably not more than a dozen plantations in existence, the scarcity of labor greatly hindering development. The years 1915 and 1916 witnessed the best sugar business in a quarter of a century, and hopes are entertained of a revival of the industry. The soil of the sugar lands is fertile and the same ground may be used for many consecutive years.

Cacao has been planted and cultivated since the early days of the colony. In the years immediately following the abolition of slavery the planters turned their attention to the raising of this product and by 1870 1,000,000 pounds were being exported annually. During the next decade the production doubled, and it continued to increase steadily until 1895, when 9,000,000 pounds were exported. This was the record crop and later years witnessed a steady decline, the total for 1912 being only about 2,000,000 pounds. In 1915 the production was less. The United States, the principal purchaser of the cacao, bought only $202,405 worth in 1915, as compared with $355,347 in 1914 and $440,086 in 1913.

Coffee was once a great crop and it is recorded that near the end of the eighteenth century about 400 coffee plantations existed, producing annually more than 12,000,000 pounds. Lack of labor, following the abolition of slavery, has practically eliminated coffee as an important product, the present annual crop averaging less than 500,000 pounds.

Cotton, like most of the other products mentioned, was once an important crop, about 3,000,000 pounds having been the annual production 100 years ago. Practically none is grown at the present time and absolutely none exported, shipments having ceased a score of years ago.

Balata gathering, like most other industries, shows signs of declining. For a while it took first place among the colony's industries, but general neglect of the trees has caused a decrease in the amount exported. The introduction of better methods would awaken the industry.

Rice cultivation, unlike other fields of activity, is showing steady progress. The colony is, however, still purchasing large amounts of the product, mostly from British Guiana. Bananas are also raised and were once sold to the United Fruit Co. Following the cancellation of the contract with that company the production commenced to fall off, although a small quantity is occasionally shipped to Europe.

GOLD MINING.

Gold has been mined for a long time in Dutch Guiana. In 1876 a large discovery was made and there was a general rush to the field. During the 10 years to 1914, the amount of gold produced consistently declined, but in 1915 there was an increase in the production and nearly $800,000 of the bullion was exported to the United States. A large number of European companies have invested in the gold mines, but few attempts where machinery was used were successful. Those entering the field should use great caution.

UNDEVELOPED RESOURCES—FACTORS RETARDING DEVELOPMENT.

There are in Dutch Guiana immense areas of forest, practically untouched and awaiting the investment of capital. Lack of transportation facilities hampers the development of the timber industry. Other than the somewhat uncertain rivers there are no suitable means of transport, as no roads have been cut through these forests. The railway, although it serves a useful purpose, touches only a small portion of the forest belt. Behind these forests, as in British Guiana, are fine grassy savannahs, capable of feeding many thousands of cattle. These lands likewise await means of transportation. Large untouched mineral resources are also believed to exist in the interior.

It is stated that oil has been located in three places, as follows: (1) On the Surinam River, 6 miles below Kabele Station, on the railway about 97 miles from Paramaribo; (2) on the Marowijne River, 100 miles above Albina; and (3) between the Surinam River and the railway, 48 miles above the head of deep-water navigation. The deposit found on the Marowijne River is said to offer the best prospects. There have been no developments as yet.

Dutch Guiana is certainly rich in undeveloped resources, despite the fact that the colony has not made any considerable progress since the days of the abolition of slavery. Absence of proprietors from the country and lack of sufficient labor have had much to do with this. East Indian coolies, as in British Guiana, have been brought to the colony under indentures for a term of years. There is, it is stated, not enough labor in busy seasons and far too much in dull seasons. The high cost of immigration and maintenance of the coolies adds considerably to the labor cost. The Dutch colonial government has for some time past been studying the general situation in Dutch Guiana, and it is hoped that the general improvement in conditions occasioned by the rise in sugar will be of a permanent character and that the field will again prove attractive for settlement and the investment of capital.

FRENCH GUIANA.

French Guiana, although rich in tropical wealth, has never assumed importance. It is about one-third the size of France and contains a population of about 50,000, a considerable portion of which consists of convicts and others deported from France or from various French colonies. In the early days of the colony various attempts were made to settle and develop it, but owing in most cases to mismanagement and lack of knowledge concerning methods to be followed in tropical lands, these attempts generally resulted in failure. To-day a vast proportion of the interior remains clothed in virgin forest and unexplored. Cayenne, at the mouth of the River Oyack, is the capital and only important city.

Gold is the important product of French Guiana, its production generally exceeding $2,000,000 per annum. There are about 225 claims and concessions being developed, many of them being worked by the paroled convicts living in the gold-bearing districts. There is doubtless a considerable amount of undiscovered gold in the interior, awaiting roads and other means of access. Phosphate rock is practically the only other mineral, and this is shipped abroad in small quantities.

Forest products are next in importance to gold, and a large quantity of rosewood and extract of rosewood is annually shipped, while smaller amounts of various hardwoods and some balata gum are also sent abroad.

Traces of petroleum have been discovered some distance southeast of the Marowijne River. There are no indications as yet that any extensive development will be possible.

Other products of importance exported are vegetable oils (of which a comparatively large quantity is obtained), cacao, and a few domestic animals. Little or no sugar is grown in French Guiana.

French Guiana has no public debt. Railways have been talked of as a means of development of the interior, and one will probably be pushed inland in the not distant future. In October, 1913, a concession was granted for the construction of a line into the interior to connect the basins of the rivers Camopi, Approuague, Mana, and Inint. There is telephone communication between Cayenne and the interior, reaching various important points.

Banking facilities are provided by the Bank of Guiana, established in 1849. This bank, located in Cayenne, has a capitalization of 600,000 francs and reserves of 535,865 francs. The 500-franc shares of the institution were quoted in Paris in May, 1918, at 1,005 francs. The dividend from 1917 business was 20½ per cent, as compared with 16 per cent for 1916 and 8½ per cent for 1915.

There are several French companies interested in the colony, mostly in mining, local shipping, exports and imports, timber producing, etc. One of the largest companies in the field is the Société Française de Navigation et de Transports de la Guyane, operating coastal and river steamers, launches, etc. Its capitalization is approximately 400,000 francs and its head office is in Paris.

PARAGUAY.

INTRODUCTION.

Paraguay, a land of rich but undeveloped resources lying between northeastern Argentina and the southern portions of Brazil and Bolivia, has an area estimated at 171,000 to 196,000 square miles and a population probably in excess of 800,000. The profile of the land is that of a plain surmounted by low mountain ranges, mostly lying to the eastward, the country being covered partly with fine forest areas and partly with rolling grassy plains sufficient in area for the sustenance of countless herds of cattle. Fine farming and fruit-raising country offers opportunities for settlement and development. The climate, though at times quite warm, may be said to be healthful.

Paraguay, though better provided with means of outside communication than in the past, suffers from an almost absolute lack of internal communications. The one railway in the country covers only a limited area, and roads, except near the main centers of population, are practically nonexistent. Neither capital (so badly needed) nor immigration has been attracted to the land, although the Government is doing what it can to attract settlers by paying their passage from Buenos Aires, giving them land and loaning them portions of their necessary capital without interest charges.

Asuncion, the capital of Paraguay, has a population of 90,000 and lies at the junction of the Paraguay and Pilcomayo Rivers. The city has direct rail and water communication with Buenos Aires, most of the traffic being by water. It is the chief city and port of the Republic, has a number of parks, an electric tramway service, etc.

There are several other cities and towns of moderate importance in the country, the most important being Villa Rica, Paraguari, Villa Concepcion, and Encarnacion. These cities are mostly located along the Paraguay Central Railway (of which Villa Encarnacion is the terminus) and have populations varying from 13,000 to 23,000.

GOVERNMENT LOANS AND FINANCES.

That Paraguay should have had financial difficulties during its existence as a Republic is not a surprising fact. The great war that ended with the death of President Lopez in 1870 left the country destitute of men and money, and it does not seem surprising that the two 8 per cent loans contracted 1871 and 1872, £1,000,000 sold at 80 per cent and £2,000,000 at 85 per cent, should have gone into default (1874). About £1,494,600 of these two loans was purchased by the Government for cancellation. Holders of the remaining £1,505,400 bonds received £850,000 in 2–4 per cent bonds and 2,177,344 acres of public land of the best description.

A company known as the Paraguay Land Co. (name afterwards changed to the Anglo-Paraguayan Land Co.) was formed to sell or develop this land, which had been divided among the bondholders in the proportion of 145 acres to each £100 of unpaid coupons. Warrants of £100 each had been issued to cover each 145 acres of land, and these were exchanged for £10 in shares of the land company, which was capitalized at £250,000. The land company also issued £61,710 5 per cent debentures, the funds to be used to develop the properties. These properties have since been disposed of and the company liquidated.

In 1892, following a period of depression throughout the Republic, interest payments were not met. In 1896 an agreement was made between the bondholders and the Government whereby interest payments commencing with the July, 1896, coupon would be at a rate of 1 per cent for three years, 1½ per cent for three years, 2 per cent for three years, 2½ per cent for the next two years, and 3 per cent thereafter. It was agreed that—

(1) The arrears coupons from July, 1892, to January, 1896, would be funded into bonds at par bearing the above rates of interest.

(2) A sinking fund of ½ per cent would commence operation in January, 1900.

(3) As security for the loan the State was to assign the export duties on yerba mate while reserving the right to increase, diminish, or suppress them; in the latter case some other tax was to be assigned for the service of the debt. One-twelfth part of the sum required for the interest and sinking fund was to be placed in the hands of the bondholders' agent at Asuncion on the first day of each month. In the event of any surplus being earned from the yerba duties, this sum was to be credited to sinking fund for the amortization of bonds.

(4) In the event of the monthly payment not being made for the period of 12 months, the bondholders were to recover all their rights to interest rates, etc., under the agreement covering the bond readjustment made in 1885.

Following the outbreak of the European war, the country faced a severe crisis, which it met in the best manner possible under the circumstances. Exchange conditions and the difficulties in making remittances were partly the cause of the delay of several weeks in making the payment of the July, 1915, coupon, payment on which was made with interest at 6 per cent on August 23, 1915. The January, 1916, and July, 1916, coupons were paid with fair promptness. The coupon due January, 1917, was not met on date of payment. Although some of the industries of the country, particularly cattle raising, have been fairly successful, the sources of revenue for the Government have continued considerably below normal. Imports, which amounted to $8,119,997, United States currency, in 1913, dropped to $2,405,888 in 1915, the lowest total in many years. The figure for 1916 was $4,679,033.

Including bonds issued for principal and interest, a total of £994,600 was issued of the bonds just discussed. The sinking fund began operation in 1900, and from that date to 1914 purchased bonds as follows:

Years.	Amount of bonds redeemed.	Average cost.
		Per cent.
1900	£13,100	19
1901	18,700	21¾
1902	14,350	27
1903	25,200	31
1904	10,100	34
1905	21,100	46
1906	10,600	48
1907	19,300	49
1908	£14,200	50
1909	18,300	50½
1910	19,500	54½
1911	20,300	55
1912	21,000	56
1913	22,200	56
1914	11,200	57½
1915–16	None.	....

In addition to the above amounts, £10,100 (cost 23¾ per cent) and £6,000 (cost 25 per cent) bonds were retired during 1901 and 1902 from surplus revenues of the export duties on yerba mate. Through sinking funds which were continuously operated until the outbreak of the European war, the total amount of the external bonds has been reduced to £719,400. The table just given indicates the steady advance in the value of Paraguayan bonds. It also shows the gradual improvement in the financial and economic condition of the inland Republic prior to the European war. The highest price reached by the bonds was 59 per cent, shortly before the outbreak of the war. At that price the yield as an investment was only slightly in excess of 5 per cent. At the closing of the London Stock Exchange on July 27, 1914, the price was 57 per cent. In 1916, owing partly to the war-time condition of the London market, the price declined considerably below that figure, and at the close of 1916 was about 43 per cent.

There are no issues of internal bonds outstanding, other than those held by the Paraguay Central Railway (which see). The Republic during 1912 contracted from the Banco de la República a loan of $500,000 at 9 per cent, which, however, has since been reduced to a small amount. There is a small floating debt, as well as an issue of $115,000,000 paper currency.

The Republic has authorized a loan of $5,000,000 United States gold to take care of external and internal debts, for a general financial rehabilitation, and for general development purposes.

The exchange situation in Paraguay is a very difficult one, the paper currency being subject to wide fluctuations. For a considerable period before the breaking out of the war, exchange remained fairly steady at the rate of 1,500, at which rate the paper peso was worth approximately $0.06 United States currency. During the financial depression that Paraguay experienced just before the beginning of the struggle in Europe, the currency began to depreciate, reaching 2,100 per cent, or less than $0.05 United States currency, in July, 1914. In 1915 the Government found it necessary, owing to conditions then existing, to issue $50,000,000 paper, increasing the amount in circulation from $65,000,000 to $115,000,000. The exchange rate reached its highest point in July, 1915, when it stood at 4,200, by which the paper peso was equal to about $0.024 United States currency. At the close of 1916, the paper peso was worth, roughly, $0.035. The question of exchange has engaged the attention of the Paraguayan Government, and in 1916 it adopted a scheme with which to meet the situation. The basis of the plan was that all exporters should declare the gold value of their exports and buy from an exchange bureau established by the Government paper money at a fixed rate, thereby leaving the gold in the country for circulation. This plan practically put an end to fluctuations in exchange and improved general business conditions throughout the country.

BANKS.

Banking development in Paraguay is in its infancy, and in consequence there is not much to relate concerning it. There are in the Republic six banks of various descriptions. These banks will be described briefly:

Banks.	Capital.		Reserves.	
	Gold pesos.	Paper pesos.	Gold pesos.	Paper pesos.
Banco de la República	4,000,000		1,215,447	
Banco Mercantil de Paraguay		20,000,000		18,000,000
Banco Agrícola del Paraguay		34,590,097		
Banco de España y America	629,244		17,527	
Caja de Crédito Comercial		594,300		102,102
Banco Constructor del Paraguay		1,466,000		Not stated.
Total	4,629,244	56,650,397	1,232,974	18,102,102

The Banco de la República is the most important bank in the country. It is capitalized, as stated above, at 4,000,000 gold pesos, and may be said to be a semigovernmental institution. The reserves, as stated above, were 1,215,447 gold pesos in 1915, as compared with 1,164,169 in 1914, 274,839 in 1913, 199,087 in 1912, 133,657 in 1911, 70,629 in 1910, and 27,650 in 1909. Deposits amounted to 525,372 gold pesos and 38,662,440 paper pesos; deposits in the savings bank, or caja de ahorros, amounted to 85,757 gold pesos and 7,171,994 paper pesos; loans and discounts totaled 4,642,472 gold pesos and 20,179,227 paper pesos. Dividend payments have not been large, the maximum rate being 8½ per cent, paid in 1913. Current funds amounted to 724,886 gold pesos and 26,071,886 paper pesos. The Banco Francés del Rio de la Plata, of the Argentine Republic, is largely interested in this institution.

The Banco Mercantil del Paraguay is the oldest institution of its kind in Paraguay. Its deposits are the largest of any of the banks, amounting to 570,311 gold pesos and 64,283,065 paper pesos in the regular banking institution and 135,856 gold pesos and 20,815,032 paper pesos in the Caja de Ahorros. Loans and discounts totaled 2,665,121 gold pesos and 54,914,601 paper pesos. Current funds totaled 7,400,000 paper pesos. The Banco Mercantil del Paraguay maintains branches in the more important cities of the Republic. It acts as local agent for the Corporation of Foreign Bondholders, of London, which represents the holders of the external bonds of Paraguay and collects and remits funds for the service of the loan. Dividends in past years have reached as high a rate as 20 per cent, but in recent years rates have been lower. The fact that the bank's business is conducted wholly in Paraguayan paper has affected its business during the past three years. However, the bank, partly at the expense of dividends, has increased its reserve from 7,500,000 paper pesos in 1912 to 18,000,000 paper pesos at the beginning of 1916. The amount of business handled by the bank during 1915 was 3,923,788,864 paper pesos, which at the average low rate of exchange for 1915 was considerably less in value than the business of 1913 and 1914.

The Banco Agrícola del Paraguay was formed to organize and assist the general agricultural and industrial development of the Republic. Loans outstanding at the beginning of 1916 amounted to 17,175,632 paper pesos and 14,989 gold pesos; 12,102,613 pesos of these loans were made for agricultural purposes and the remainder mostly for industrial and building purposes. The bank's deposits totaled 2,678 gold pesos and 833,660 paper pesos. The total of loans and discounts was 33,996 gold pesos and 26,993,992 paper pesos, including 14,324 gold pesos and 9,247,760 paper pesos current funds deposited in other banks. The present capitalization of the bank, 34,590,097 pesos, compares with 15,606,359 pesos in 1914.

The Banco España y America is capitalized (1915) at 629,244 gold pesos, this figure comparing with 615,868 in 1914 and 526,592 in 1913. Deposits in 1915 totaled 72,405 gold pesos and 6,194,362 paper pesos, as compared with 59,992 gold pesos and 3,763,708 paper pesos in 1914. Deposits in the Caja de Ahorros in 1915 totaled 30,067 gold pesos and 4,772,520 paper pesos, as compared with 37,384 gold pesos and 1,832,206 paper pesos in the preceding year. Loans and discounts amounted to 86,787 gold pesos and 9,576,288 paper pesos. The business handled by the bank amounted to 373,423,385 paper pesos, as compared with 32,656,492 paper pesos in 1914, which was practically its first complete year of operation. The capitalization may be increased to 2,200,000 gold pesos.

The Caja de Crédito Comercial is a small institution, compared to the other banks. A general banking business is handled. The present capital, 594,300 paper pesos, compares with 524,200 paper pesos in 1908–9. Deposits amount to 303,688 paper pesos, in addition to 50,137 pesos in the Caja de Ahorros. Loans and discounts totaled 1,043,751 paper pesos, and the general business for the year 1915 was 7,466,002 pesos.

The Banco Constructor del Paraguay carries deposits amounting to 126,500 paper pesos, not including 109,853 paper pesos in the Caja de Ahorros. Loans and discounts totaled 2,963,694 paper pesos. The paid-in capital of the bank is 1,466,000 paper pesos. The bank makes loans for building purposes, does an insurance, commission, export, and import business, and performs, in addition, the usual functions of a bank.

INSURANCE COMPANIES.

In the year 1916 there were two insurance companies in Paraguay under local ownership. These were La Paraguaya, with a capitalization of 500,000 paper pesos, and La Nacional, with a capitalization of 1,000,000 paper pesos. Both of these companies do a general insurance business. The former company reported collections during the year to the amount of 368,432 paper pesos, and payments on policies and taxes of 47,840 pesos. Accumulated funds amounted to 1,448,499 paper pesos. La Nacional reported collections to the amount of 892,608 paper pesos and payments of 608,064 paper pesos. Accumulated funds totaled 1,296,862 paper pesos.

RAILWAY DEVELOPMENT.

The history of railway development in the Republic of Paraguay centers around one system, the Paraguay Central Railway. The line dates its existence from the year 1859, when the Government began its construction with the intention of carrying it from Asuncion as far as Villa Rica, 96 miles. The line was continued as far as Paraguari, about 50 miles, prior to the outbreak of the war against Argentina, Uruguay, and Brazil.

In 1889 the Paraguay Central Railway Co. was formed in England and purchased the line from the Government, agreeing to extend it to Villa Rica and later to continue it to Villa Encarnacion, opposite Posadas, Argentina. The line to Villa Rica was completed at the close of 1889, and a further 60-mile extension was completed in 1891. The final extension to Villa Encarnacion was put in service in 1911. In October, 1913, an extension of the Argentine Northeastern Railway was completed to Posadas and through passenger-train service established between Buenos Aires and Asuncion. In order to make direct connections it was necessary to change the gauge of the Paraguay Central Railway from 5 feet 6 inches to 4 feet 8½ inches. The connection with Argentina is afforded by means of train ferries. Two passenger trains a week, carrying through sleeping cars, are maintained in each direction between the two capitals.

The capitalization of the railway, which was increased considerably following the change in gauge, consists of £600,000 prior lien debenture stock, bearing interest at the rate of 6 per cent per annum, £500,000 6 per cent three-year notes, £1,300,000 5 per cent debenture stock, and £562,930 ordinary shares of £10 each. A part of these funds was invested in the acquisition and electrification of the Asuncion Tramway, Light & Power Co.

In October, 1914, a receiver was appointed for the company and thus far no plan of reorganization has been effected. At the same time a receiver was appointed for the Asuncion Tramway, Light & Power Co.

Earnings of this railway covering a period of years have been as follows (figures expressed in pounds sterling):

Calendar years.	Gross earnings.	Net earnings.	Miles operated.	Number of passengers carried.
1906	£55,208	£22,569	155	975,477
1907	71,452	24,602	155	1,002,690
1908	86,208	35,581	155	962,250
1909	77,446	32,417	155	603,231
1910	97,126	48,337	156	518,709
1911	120,023	51,421	168	470,686
1912	111,983	44,509	232	394,660
1913	146,511	65,937	232	532,807
1914	156,240	66,166	240	623,368
1915	100,774	39,887	255	564,941
1916	125,923	56,300	255	554,000

It is stated that for the year ended June 30, 1918, the gross earnings (preliminary totals) were £154,000, an increase of approximately £17,000 as compared with 1916–17. Freight tonnage for

1915–16 amounted to 161,000 tons, as compared with 135,482 in 1914–15 and 155,911 in 1913–14. Traffic in live stock is increasing. In 1905–6 only 278 animals were carried; in 1908–9 the total was 3,290; in 1911–12 2,299 were carried; in 1912–13 the number increased to 10,619 and the receipts were £639; in 1913–14 and 1914–15 the totals were 14,097 and 17,057 and the receipts £3,113 and £4,517, respectively. In 1915–16 the receipts from the cattle traffic jumped to £11,600. Rolling stock in service June 30, 1915, consisted of 23 locomotives, 63 passenger cars, 516 freight cars, and 9 other cars.

The company plans, if possible, following the readjustment of its finances, to build a branch to the Brazilian boundary near the junction of the Parana and Iguassu rivers, to join an extension of the São Paulo-Rio Grande Railway, which will open a new and shorter route from the Atlantic Ocean to Asuncion.

As of June 30, 1915, the company carried among its assets £175,038 Government loans outstanding. Since that date the Government has paid the company £75,000 in internal bonds bearing interest at 6 per cent per annum.

The international traffic between Argentina and Paraguay is slowly developing. A total of 2,383 passengers were carried during 1915, as compared with 3,474 in 1914; the 1916 total was larger.

As previously stated, the Paraguay Central Railway is the only line of importance in the Republic. The following table indicates the various railways in the country, their mileage, gauges, etc.:

Railway lines.	Length.		Gauge.
	Kilometers.	*Miles.*	
IN EASTERN PARAGUAY.			
Central of Paraguay, main line, Asuncion to Encarnacion [a]	370	230	4 feet 8½ inches.
Central of Paraguay, Borja to Tacuaras line [a]	55	34	Do.
Concepcion to Horqueta Railway (Guggiari, Gaoni & Co., owners [b]	44	27	0.75-meter.
Quebrachales Fusionados Puerto Max (line to river) [c]	14	9	Do.
Puerto Ybapolo timber line [c]	24	15	Do.
IN WESTERN PARAGUAY.			
Puerto Galileo line [c]	24	15	Do.
Campos & Quebrachales Puerto Sastre Railway [c]	44	27	Do.
Quebrachales Fusionados Puerto Maria [c]	40	26	Do.
Carlos Casado (Ltd.) [c]	50	31	Do.
New York & Paraguay Co. [c]	41	25	Do.
Cia. Forestal del Paraguay [c]	15	9	Do.
Maria Luisa [c]	5	3	
Puerto Guarani line	26	16	0.766 meter.
Total	752	467	

[a] Common carriers, handling general traffic in freight and passengers.
[b] Primarily a lumber railway; handles general traffic in freight and passengers also.
[c] Not constructed for general traffic; built to handle quebracho logs or lumber.

The total railway mileage in Paraguay, as shown above, is 467, of which about 291 miles represent common carriers. None of the lines in the Región Occidental, or western Paraguay, are built for general service, and none of them make public any statement of earnings and expenses.

There is little doubt that Paraguay will, possibly within the next decade, have a much larger railway mileage. Plans have been laid, although the project has been delayed for a time, to construct a line northwesterly across the Chaco to Bolivia, opening to the world an immense area of undeveloped country and bringing forth immense forest wealth. Once this and other lines are constructed, the country will enjoy far greater prosperity.

PUBLIC UTILITIES.

Thus far development along the line of public-utility enterprises has been of an extremely limited nature. Practically the only existing company in the field is the Asuncion Tramway, Light & Power Co. (Ltd.), controlled by the Paraguay Central Railway. This latter company has made loans to the Asuncion Tramway, Light & Power Co., to the amount (including interest) of £87,685, and has invested, in connection with purchase, etc., the sum of £229,359, which has been reduced to approximately £207,000. The consideration for this outlay on the part of the Paraguay Central Railway consists of £119,850 cash or £144,398 debentures, at the option of the tramway company; £15,624 cash; £240,000 ordinary shares of £1 each; 135,274 preference shares of £1 each. The railway is obligated to expend £9,465 more, for which it will receive preference shares. The nominal capital of the tramway company is 3,000,000 gold pesos.[1]

On October 16, 1914, a receiver was appointed for the Asuncion Tramway, Light & Power Co. This company was unable to meet the interest on advances and debentures issued to provide funds for electrification purposes. Operating results have been below expectations, partly through exchange conditions.

During the years 1913 to 1915 earnings have been reported as follows:

Items.	1913	1914	1915
Passenger traffic	£22,951	£33,195	£24,229
Freight traffic	766	627	649
Electric lighting	....	4,331	16,139
Other	2,301	1,630	1,030
Total receipts	26,018	39,783	42,047
Operating expenses	18,284	37,202	39,615
Net earnings	7,734	2,581	2,432

Earnings for 1916 were slightly in excess of those for 1915.

During 1915 the tramways carried a total of 3,102,145 passengers, as compared with 2,850,955 during 1914. There were also carried, during 1915, 8,043,102 pounds of freight (5,080,461 pounds in 1914) and 670,212 pounds of baggage (745,445 pounds in 1914). The length of the system is 43 kilometers (27 miles), of which 28 kilometers are operated by electricity, 11 kilometers by steam, and 4 kilometers by mules. Employees number 414. There are in service 19 electric cars, 1 steam car, 5 horse cars, and 8 freight cars.

MINING.

Mining in Paraguay may be spoken of in the future tense. Thus far the mineral wealth of the country has remained practically a sealed book. Among the mineral products known to exist may be mentioned manganese, oxide of iron, graphite, basalt, arsenic rocks, agate, marble, etc. Hopes are entertained that the mining of manganese will some day be an important industry in the Republic. This, however, is an industry purely of the future, inasmuch as the deposits are now inaccessible to any market of importance. There are at present no mining companies of any importance in Paraguay.

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[1] EDITOR'S NOTE.—Information received as this monograph was going to press indicates that a considerable portion of the assets of this company has now been acquired by the Cia. Americana de Luz y Tracción, controlled by the Italian, Swiss, and Argentine capitalists that own the Cia. Italo-Argentina de Electricidad, of Buenos Aires.

QUEBRACHO AND OTHER FOREST INDUSTRIES.

The quebracho or "ax breaker" is one of the valuable trees found mostly in the Chaco districts of Argentina, Brazil, and Paraguay. In addition to containing tannin, an extract used extensively in the tanning industry, the timber, which is one of the hardest known, is used extensively in the manufacture of railroad ties. Quebracho ties are to be found in Argentina, Brazil, Paraguay, Uruguay, and even in European countries. The quebracho may be cultivated, notwithstanding its extremely slow growth, but it is usually gathered wild. There are said to be larger amounts of the wood in Paraguay than in the neighboring Republics. The first recorded use of quebracho for tanning purposes was in the year 1875, when it was successfully experimented with in France. In 1889 a factory for its extraction was established at Puerto Galileo, Paraguay, this being the first factory of its kind in South America. The concern is known as the Quebrachales y Estancias Puerto Galileo. The principal companies engaged in the industry in Paraguay are the following:

Companies.	Capital.	Area of properties.		Railway mileage.	Production, 1915.
	Gold pesos.	*Hectares.*	*Acres.*		*Tons.*
Campos y Quebrachales Puerto Sastre	1,488,000	225,000	555,985	28	4,800
Sociedad Forestal de Puerto Guarani	583,000	78,745	194,581	17	3,228
Compañía de Tierras Carlos Cascado (Ltda.)	1,500,000	2,437,000	6,021,936	31	6,257
Quebrachales y Estancias Puerto Galileo	1,000,000	187,500	463,320	15	1,074
Quebrachales Fusionados	[a]770,000	[b]46,708	115,417	9	....
New York & Paraguay Co	2,000,000	337,500	833,976	26	None.
Total	7,341,000	3,312,453	8,185,215	126	15,359

[a] This is an Argentine company controlled by the Forestal Land & Timber Co., of London. Its official capitalization is $7,000,000 Argentine paper.

[b] Does not include properties at Puerto Maria, regarding which data could not be obtained.

The total capacity of annual production of the above properties is more than 31,200 tons.

Among various other companies controlling quebracho properties or otherwise interested in the industry may be mentioned (1) La Industrial de Nueva Italia, with an authorized capital of 100,000 paper pesos; (2) the American Quebracho Co., with an authorized capital of 3,000,000 gold pesos; (3) La Forestal del Paraguay, with an authorized capital of 264,000 gold pesos; and (4) La Rural Belga Sud-America, with an authorized capital of 226,000 gold pesos. La Forestal del Paraguay operates about 10 miles of 0.75-meter gauge railway to its properties. The Quebrachales Fusionados properties are located in the eastern part of the Republic; most of the other properties are in western Paraguay. Of the 583,000 gold pesos shares of the Sociedad Forestal de Puerto Guarani, 220,000 pesos were issued during the year 1915.

The total exportation of quebracho extract during 1913, 1914, and 1915 amounted to 25,840,267 pounds, 28,021,150 pounds, and 40,361,990 pounds, respectively. Of the total exported in 1915, 40,334,322 pounds, valued at $1,098,474, were shipped to Argentina.

For a further discussion of the quebracho industry see the chapter on the Argentine Republic, page 84.

Many other varieties of timber exist in the great forest areas of Paraguay. The development in this field is in its infancy. During the past few years, however, several concerns have been established with fair-sized amounts of capital invested. When better communications and lower freight rates are established there will be wonderful opportunities to develop the softwoods of the country for the purpose of making pulp. There is an almost limitless supply of softwood trees, which, in time to come, will have considerable commercial value.

An important tree in Paraguay is the curupay, a hardwood, used commercially in South America to make railway ties. This timber is extremely hard and durable and will not decay in water. It is somewhat similar to the quebracho, since its bark may be used for tanning purposes. In this respect, however, it does not equal the quebracho. Several other hardwood trees, not unlike the curupay, are found in the forests. Their bark is used locally for tanning purposes. Numerous other hardwoods and semihardwoods are found, suitable for high-class furniture and cabinetmaking. A tree locally known as the petereby, somewhat like English walnut, is found in abundance and has been employed in the manufacture of railway coaches used in Argentina and Uruguay. Lignum-vitæ, a tree of considerable commercial value, is also a native of the Paraguayan forests. Only small quantities of it have thus far been shipped from the country. Laurel and cedar are also fairly abundant. Scores of varieties of other trees exist, and some of them are used locally.

The vast forests of Paraguay will some day be sources of great wealth to the inland Republic. The total value of the exports of forest products in 1915 amounted to 1,730,692 gold pesos, including quebracho extract to the value of 1,098,474 gold pesos. Practically all of the exported forest products went to Argentina and Uruguay. Customs receipts from the exportation of forest products totaled 14,402 gold pesos and 956,015 paper pesos, not including quebracho extract. Among the companies interested in the timber industry may be mentioned the following:

Companies.	Capital authorized.	Capital invested.
	Gold pesos.	*Gold pesos.*
Timber Yuty Co. (Ltd.)	250,000	125,000
La Rural de Yegros	160,000	160,000
La Industrial Paraguaya [a]	[a] 5,000,000	[a] 3,464,120
La Italo-Paraguaya	200,000	200,000
Montes y Estancias San Jose	150,000	115,000
Campos y Bosques de Loreto	200,000	40,000
Cia. de Tierras Carlos Cascado (Ltda.)	1,500,000	675,000
Industrial & Commercial Co. of Northern Paraguay	1,500,000	500,000

[a] See description of company under heading of "Yerba-mate industry."

In addition to the above list, several quebracho companies previously mentioned are interested in the general timber industry. Certain of the above companies have been noted as being interested in cattle raising, etc. Another important concern in the timber industry in Paraguay is Guggiari, Gaoni & Co. In addition to its extensive timber interests, this concern operates a railway line 29 miles in length extending from Concepcion to Horqueta. This line, in addition to handling the lumber, does business as a common carrier.

THE LIVE-STOCK INDUSTRY.

The live-stock industry, particularly that branch pertaining to cattle, is certain to have a great future in Paraguay. There are enormous areas capable of providing food for millions of cattle, and it seems likely, once cheaper transportation is obtainable, that large investments will be made in this field. The estimated number of live stock in the Republic at three different periods has been as follows:

Live stock.	1877	1899	1915
Cattle	200,525	2,283,089	5,249,043
Sheep	6,668	214,058	600,000
Horses	21,140	182,790	478,000
Mules and asses	2,799	7,557	35,000
Hogs	3,026	23,887	61,000
Goats	....	32,334	87,000

The total number of cattle, as stated above for the year 1915, compares with other important cattle-producing countries, as follows:

Countries.	Number of cattle.	Approximate population.	Number of cattle per 1,000 inhabitants.
Paraguay	5,249,043	1,000,000	5,249
Uruguay	8,192,602	1,226,000	6,518
Argentina	29,120,000	7,500,000	3,882
Brazil	30,705,000	22,300,000	1,376
Australia	11,819,000	4,750,000	2,488
United States	56,592,000	95,875,000	590

The number of cattle per square kilometer in Paraguay is 11.8, as compared with 41.6 in Uruguay, 9.7 in Argentina, 3.5 in Brazil, 1.5 in Australia, and 6 in the United States.

Covering a period of six years, the exports of cattle, hides, etc., have been as follows:

Years.	Live animals exported.	Hides, skins, etc., exported	Percentage of total cattle.
1910	11	343,458	8.3
1911	137	302,512	7.3
1912	4,661	342,703	7.9
1913	36,564	398,048	9.3
1914	24,385	342,782	7.4
1915	29,509	340,692	6.4

The number of live cattle exported during 1916 was considerably larger than that during 1915.

The live-stock industry in the Republic has attracted considerable amounts of foreign capital. There follows a list of important companies interested wholly or partly in the raising and selling of live stock or otherwise identified with the live-stock industry:

	Capitalization. Gold pesos.
La Ganadería Saccerello	1,000,000
La Ganadería Paraguaya	500,000
La Ganadería Franco-Paraguaya	200,000
Montes y Estancias San Jose	150,000
La Rural Española	300,000
Campos y Bosques de Loreto	200,000
Fuerto Olimpo	500,000
Cía. Paraguaya de Tierras, Campos y Ganaderías	1,500,000
Plantaciones y Criadores Girad	50,000
La Ganadería Cancio Deandreis	140,000
La Ganadería Piri-Puco	100,000

La Ganadería Paraguaya is controlled by the Paraguay Land & Cattle Co., incorporated in Maine, U. S. A., in 1913, and identified with the Farquhar-Pearson enterprises. The property covers 54½ leagues in the Chaco country, with two ports and about 14 miles of river frontage. The company also owns about 1,000 leagues of cattle lands in the interior of the Chaco. The 1,500,000 shares of the Paraguay Land & Cattle Co. are held mostly by the Argentine Railway, and are deposited as part collateral for the railway company's issue of 6 per cent notes. The Paraguay Land & Cattle Co. experienced difficulty in South America in renewing some of the unpaid installments of the purchase price of parts of its lands, and any renewals it might have been able to arrange would have drawn interest at as high a rate as 12 per cent. It was decided by the Argentine Railway note holders, in order to protect its collateral, to obtain a loan of £84,000, secured on the land and cattle properties, with a priority to the notes. The amount of the loan includes the commission and interest thereon, which items total 8 per cent, as compared with 12 per cent as above. The proceeds were used to meet the installments, when due, of the purchase price of the land and to meet further expenditures to carry on the business. The Paraguay Land & Cattle Co. reported a profit of £18,600—this, however, representing the increased value of the company's herds.

In addition to the above list of companies mention might be made of the New York & Paraguay Co., previously noted as a producer of quebracho. This concern has a large acreage of lands suitable for cattle raising and supporting a large herd of animals.

AGRICULTURE.

THE SUGAR INDUSTRY.

The sugar industry in Paraguay is growing in importance year by year and is likely to expand considerably in the future. The soil and climate are highly suitable for the production of cane. Until recently very primitive methods have been in use in both the cultivation and the manufacture of the product. An acre of land will produce, on an average, nearly 12 tons of cane under present conditions. Most of the labor on sugar plantations is performed by hand. Until recently the greater part of the sugar and sugar cane has been used in the manufacture of industrial alcohol and of a native rum known as "cana." The production of sugar cane, sugar, alcohol, and "cana" during a period of six years has been as follows:

Years.	Cane.	Sugar.		Alcohol.		"Cana" (native rum).	
	Tons.	*Kilos.*	*Pounds.*	*Liters.*	*Gallons.*	*Liters.*	*Gallons.*
1910	15,417	834,000	1,838,655	130,000	34,342	42,525	11,234
1911	9,161	478,000	1,053,810	77,000	20,341	75,560	19,961
1912	19,837	849,800	1,873,488	217,000	57,325	257,710	68,079
1913	30,939	1,461,000	3,220,931	403,720	106,651	475,500	125,613
1914	46,107	2,559,000	5,641,584	415,200	109,684	53,350	14,093
1915	36,555	1,536,377	3,387,109	235,175	62,126	217,500	57,457

During the years 1910 to 1914, inclusive, sugar in amounts varying from 1,735,122 kilos (3,825,266 pounds) to 2,608,924 kilos (5,751,647 pounds) was imported. During 1915 the amount imported decreased to only 9,760 kilos (21,517 pounds). The average amount of sugar obtained from grinding and milling has varied from 4.3 to 5.5 per cent—an amount considerably less than that attained in Argentina (8 to 10 per cent), Brazil (9 to 14 per cent), Cuba (10 to 12 per cent), etc. This is due to the old-style machinery in use, the methods in vogue being, as stated, extremely crude. The recent advance in price and great demand for sugar has awakened the industry in Paraguay, and it is expected that large and increasing quantities will be exported to Argentina and the United States. Most of the sugar is produced in the Ybytymi district, although many sections of the Republic are said to be equally suitable for its growth. The Azucarera Villa Hayes, one of the largest producers, is located in the Chaco district. This estate produced during 1914, 271,000 kilos (597,453 pounds) of ground sugar and during 1915, 147,750 kilos (325,733 pounds). This company is capitalized at 80,000 gold pesos; shares totaling 160,000 pesos are authorized. The Azucarera Paraguaya is another important company engaged in the industry. Its capitalization is 300,000 gold pesos.

There are numerous distilleries throughout the country for the making of the "cana," etc. These are mostly very small and extremely crude.

THE YERBA-MATE INDUSTRY.

Yerba mate is a most important product of Paraguay, being raised in the eastern and central parts of the country. It consists of the leaves of a tree somewhat resembling an evergreen, which is from 15 to 25 feet in height. The leaves are bright green in color and originally were all gathered wild. In recent years, however, the trees have been cultivated with considerable success. Trees come to bearing after about 5 years and in 12 years begin to yield the maximum amount, generally 15 to 17 pounds per annum. It is generally estimated that between 10,000,000 and 12,000,000 persons in South America regularly use the drink, and its use is spreading throughout Latin Europe, and has even reached the United States. The wild yerba still exists in very large amounts, and there is no danger of an exhaustion of the supply. The tax gathered by Paraguay on the exportation of the yerba is used largely to provide funds for the service of the external loan.

At the close of the year 1915 there were 197 estates or concerns engaged in the production of the yerba. The production for the year amounted to 7,049,500 kilos as compared with 7,862,250 kilos in 1914. The Departments of Concepcion, Encarnacion, San Pedro, Ihu, and Caazapa produced practically all of this amount. Of the total raised in 1915, 4,709,213 kilos were exported. Among the companies engaged in its production and exploitation are La Industrial Paraguaya, capitalization 3,464,120 gold pesos, and Boettner & Gautier, "Yerbatero," capitalization 80,000 gold pesos. La Industrial Paraguaya is a Farquhar-Pearson enterprise, being controlled by the Argentine Railway. Its securities are largely deposited as collateral for the latter's 6 per cent notes. It earned a profit of £31,600 in 1916, which would have enabled the company to declare a small dividend, had not the funds been needed to pay off floating debt and for expansion and development purposes.

OTHER AGRICULTURAL PRODUCTS: TOBACCO, FRUIT, COFFEE, COTTON.

Eastern Paraguay is well adapted for agricultural pursuits. The Republic has been making every effort to attract immigration for the development of this field, and, as a result, several agricultural colonies of some size and importance have been established in the country. The war has put an absolute check on immigration, and consequently but little progress has been made during the past two or three years. The Government has established an up-to-date agricultural school and has appointed a number of trained inspectors to give practical lessons to those interested. The forest-cleared lands of the eastern uplands produce maize of excellent quality in abundance, and practically every grain thrives where cultivated.

The tobacco crop of Paraguay is a large source of national wealth. Cultivated mostly by small farmers, the product is sold to the exporter or to the local manufacturer of cigars and cigarettes. Paraguayan tobacco brings a good price abroad and is shipped in fair quantities to the Netherlands, Argentina, England, Denmark, Norway, Italy, and Uruguay. Small quantities of it have recently been experimented with in the United States. The Government has opened a department that classifies the grades of tobacco for export and has proved a considerable aid to the development of the industry. Exports of tobacco during recent years have been as follows (between 60 and 70 per cent of the national production is exported):

Years.	Amount exported.		
	Bales.	Weight.	
		Kilos.	*Pounds.*
1908	51,340	5,034,657	11,099,506
1909	50,483	4,850,935	10,694,490
1910	59,424	5,622,803	12,396,145
1911	72,422	6,435,358	14,187,500
1912	45,454	4,001,892	8,822,671
1913	61,077	5,827,762	12,848,003
1914	59,258	4,648,648	10,248,524
1915	74,655	7,378,934	16,267,806

In the year 1901 the amount exported totaled 23,075 bales.

In recent years fruit growing for export has been carried on extensively. The orange, formerly an article of little commercial value owing to overproduction and lack of market, now brings good prices in the markets of Argentina and Uruguay, because of the fact that it ripens in Paraguay some weeks earlier than in the countries mentioned. The through railway route to Buenos Aires has greatly stimulated the industry, inasmuch as the railway management operates through trains with cars specially constructed for the oranges. The number of oranges exported during recent years has been as follows: 1910, 136,052,630; 1911, 129,722,910; 1912, 125,491,180; 1913, 168,040,040; 1914, 149,151,050; 1915, 216,996,750. Practically all other varieties of tropical and semitropical fruits grow in abundance.

Coffee has been successfully experimented with.

Cotton is grown in Paraguay, although not on an extensive commercial scale, owing principally to lack of labor in the various districts wherein the soil is adapted to its growth. A ready market is found for the product locally, inasmuch as the supply is far from equal to the demand.

Viticulture also holds promise, as an excellent variety of grapes is cultivated. Practically none of the vine products are exported.

MANUFACTURING AND COMMERCIAL ENTERPRISES.

Factories and mills are not numerous in Paraguay. The inland Republic as it exists to-day stands forth simply as a producer of raw materials. In only a few lines of manufacturing and commercial enterprise are any large amounts of capital invested. Some of the concerns, with their capitalization, are mentioned herewith:

Enterprises.	Character of business.	Capitalization.			
		Authorized.		Outstanding.	
		Gold pesos.	Paper pesos.	Gold pesos.	Paper pesos.
Molino Nacional	Flour mill	500,000	....	500,000	....
Cia. Industrial Meilecke	Boots and shoes	250,000	....	250,000	....
Cervecería Nacional	Brewery	1,000,000	....	700,000	....
Sociedad Introductora	Importers and exporters.	100,000	....	100,000	....
Urrutia, Ugarte y Cia	do	200,000	....	200,000	....
Ruis y Jorba	do	1,000,000	....	1,000,000	....
Sebastian Brun	do	250,000	....	250,000	....
Federico Krauch y Cia	do	120,000	....	120,000	....
Perez y Sanchez	do	....	2,400,000	....	2,400,000
Jorge Casaccia	General merchandise.	400,000	....	400,000	....
Cramer & Weber	Importers and exporters.	100,000	....	100,000	....
Vierci Bros	Steamship line	500,000	....	400,000	....
Empresa de Transportes La Nacional.	do	....	1,000,000	....	600,000
West India Oil Co	Oil, etc	100,000	....	100,000	....
Sociedad Anónima de Constructores.	Building materials.	....	1,000,000	....	1,000,000

SUMMARY OF INVESTMENTS IN PARAGUAY.

Recent estimates indicate that there is invested in the principal industries of the Republic, exclusive of railways and nonpublic enterprises, a total of about 25,000,000 gold pesos and about 75,000,000 paper pesos. During 1915 a total of 1,345,509 gold pesos and 16,142,599 paper pesos was invested in various undertakings. Great Britain has invested, it is estimated, about $18,600,000 in Paraguay, this including a large majority of the external loan, most of the railway shares, the Asuncion Tramway, Light & Power property, cattle, yerba-mate, and quebracho companies, etc. France has a large number of shares in the principal banks, cattle interests, etc., and possibly has $7,000,000 to $8,000,000 gold in the country's enterprises. Argentina, Belgium, Germany, Italy, and the United States have also placed fair-sized sums in Paraguay. There are numerous opportunities for the development of the resources of the country. Thus far most of the enterprises in the field have been capitalized moderately, and for the next few years this class of enterprise will probably be the most successful.

PERU.

INTRODUCTION.

The Republic of Peru, with an estimated area of 460,000 square miles (subject to boundary settlements), contains an estimated population of 4,500,000. The sea frontage covers a distance of approximately 1,400 miles, and along the shores are numerous harbors and ports, many of the latter mere open roadsteads. Callao, Mollendo, Salaverry, Paita, Eten, Pacasmayo, Ilo, and Pisco are probably the most important of these ports and are the main outlets for the exported wealth of the country. The Republic may be divided roughly into three sections:

(1) The western lowlands, in which may be found all the Pacific ports, the cities of Lima, Trujillo, Piura, Catacoas, etc. This section of the country is the source of most of the agricultural wealth, as well as the petroleum production. In the southern part of the Republic are magnificent vineyards producing a splendid variety of grape and a number of kinds of wine much sought for on the Pacific coast of South America.

(2) The plateau lands of the central and western Andes, extending from the northern boundary to Lake Titicaca and lying from 7,500 to 14,000 feet above the sea. On this plateau or series of plateaus are located the cities and towns of Arequipa, Cuzco, Juliaco, and Huancayo and the mines of Cerro de Pasco and Morococha. Most of the Republic's mineral wealth, developed and undeveloped, lies in this section. Oil has been found in the Lake Titicaca region. Wool, hides, and leather are shipped in large quantities, while in the warmer valleys and on the mountain slopes the Indians carry on their crude method of agriculture.

(3) The eastern slope and the lowlands, a thinly populated but rich section of the Republic. The eastern slope is capable of great agricultural development, when it is placed in railway communication with the outside world. Immigration is needed badly, and this will not come until eastern and western Peru are connected by railways. The eastern lowlands are overgrown largely with dense tropical forests; they are very warm and subject to heavy rainfall. Iquitos, 2,500 miles up the Amazon, is the main port for this vast area, and from it is shipped practically all of the rubber, which thus far is the only considerable source of wealth developed in this section. Mahogany, cedar, and other hardwoods, also dyewoods of considerable value, abound in these forests but owing to the lack of communication with the outside world are inaccessible for the present at least. Vegetable ivory is also found in these forests and in time will probably become an important source of wealth to the Republic. Prior to the war Germany took a very large percentage of this product, 40 per cent of the total shipments in 1911 going to Hamburg. The trade of the district adjacent to Iquitos in 1910 reached approximately $30,000,000;

at present, owing to the war and the decline in the rubber trade, it has greatly decreased but is showing signs of a partial revival.

FOREIGN INVESTMENTS IN PERU.

As in the case of most Latin American countries, Great Britain has furnished by far the largest amount invested in Peru by any nation. An estimate compiled by the writer in 1916 placed Great Britain's investments in Peru at $121,622,500 United States currency. This included external bonds, Peruvian Corporation bonds and shares, Lima city bonds, Northwestern of Peru Railway, various sugar estates, mines, etc. The United States, whose investors control the Cerro de Pasco mines, International Petroleum Co., and a few minor industries, comes next, with perhaps $50,000,000 at stake. The Germans would rank third, although they have invested little in public companies. Their investments are limited to the Banco Aleman Transatlántico, some plantations (mostly sugar and cotton), and private mercantile ventures, which are rather numerous. Only a moderate amount of French capital has found its way to Peru. An estimate of $200,000,000 would probably cover the aggregate foreign investment in this country.

GOVERNMENT FINANCES.

Owing mainly to the fact that the Government has not succeeded in obtaining a loan of $15,000,000 United States currency for readjustment purposes, the country has as yet been unable to arrange for a consolidation of its various debts. The writer, in this compilation, is using the figures stated by the Minister of Finance of Peru on December 15, 1915, as presented by Consul General William H. Handley in his annual report for that year. This is probably the most comprehensive statement of the Republic's finances at present available. The position of the Republic at the present time is slightly better than on the date indicated below:

Classification.	Balance on Dec. 31, 1915.	Annual interest and amortization.
Internal debt:		
Consolidated loans (June 12, 1889)	$1,877,564	$129,480
Mortgaged deeds (since Dec. 17, 1898)	346,356	121,663
Pensions, chaplaincies, with interest	135,416	....
Recognized credits (suspended since 1913)	113,631	....
Puch & Co. credit (Oct. 10, 1910)	632,645	....
Bonded debt:		
Salt loan (Emprestito de Sal; mostly held in Europe)	5,402,649	408,786
Peruvian S. S. Co. loans (2)	2,733,611	255,491
Grace & Co., syndicate loans (2)	1,505,938	859,382
Gildermeister & Co. loan	217,785	153,878
Bank obligations:		
Bank of Peru and London (advances)	378,110	37,811
Joint loan from Bank of Peru and London, German Bank, and International Bank (Nov. 20, 1912)	1,760,540	127,33
Loans effected by the local banks and the Caja de Ahorros (Savings Bank), Aug. 20, 1914	2,189,925	322,162
Loan from the German Bank (Mar. 26, 1915)	875,970	234,078
Loan from the Popular Bank (June 4, 1915)	124,096	35,038
Advance by the Caja de Depositos and Consignaciones (Jan. 27, 1913, and Jan. 23, 1914)	184,570	34,065
Tax collecting company obligations:		
Loan of April, 1913	6,058,793	424,115
Drafts for account of revenues of the company to June 30, 1915	966,564	72,491

Classification.	Balance on Dec. 31, 1915.	Annual interest and amortization.
Tax collecting company obligations—Continued.		
For manufacture of tobacco	$551,600	$44,128
Advances on semimonthly payments (January to August, 1915)	318,387	31,838
Sundry loans:		
Fiscal Warehouse Administering Co. (Jan. 16, 1913, and Aug. 24, 1915)	145,995	30,172
Guano Administering Co. advance on product of company to December, 1915	359,540	23,359
Peruvian Corporation, contract for pier at Salaverry (June 18, 1915)	77,864	....
Floating:		
Schneider & Co., balance in favor of	1,459,950	....
Bondholders of the Lima to Huacho R. R	364,988	....
Peruvian Corporation, monthly payments stipulated in 1907 contract	389,320	....
Treasury obligations, value in circulation	381,534	....
Various treasury bills (January to August, 1915)	319,072	....
International postal debts (from 1913 to date)	48,665	....
Budget balances from 1908 to 1913	3,554,350	....
Due on budget appropriations for 1914	624,375	....
Due on budget appropriations for 1915	2,189,925	....
Claims:		
French claims submitted to The Hague tribunal for decision	4,866,500	....
RÉSUMÉ.		
Internal debt	3,419,440	251,142
Loans	10,195,110	1,677,538
Obligations to the banks	5,513,210	790,005
Obligations to the Tax Collecting Co	7,891,830	572,222
Sundry loans	583,398	53,532
Floating debt	9,332,184	....
Total	36,935,172	3,344,439
Claims	4,866,500	....
Grand total	41,801,672	3,344,439

NOTE.—The above obligations are to be paid in part from the proceeds of the loan of $15,000,000 that the Executive was authorized to contract in the United States.

The principal loan held externally is the Salt Loan (Emprestito de Sal), which bears interest at 5½ per cent (February and August), and which is redeemable through amortization. The bonds are listed on the London Stock Exchange. The original issue was for $5,838,000, the remainder having been retired. Drawings take place semiannually, in January and July, the redemption fund, 1½ per cent per annum, being secured by the salt tax. The life of the loan is 28½ years, dating from 1909. The bonds sell at about 90, yielding slightly more than 6 per cent. Their high and low prices since January 1, 1911, have been 102 per cent and 69 per cent.

The principal internal loan of Peru bears interest at 1 per cent per annum and sells at approximately Lp14. It has largely been retired. This issue and the "Deuda Nacional de Amortisación" (quoted 13 @ 17) are listed on the Lima Bourse.

Early in 1918 the Government of Peru authorized Lp. 2,000,000 7 per cent bonds, redeemable in 31 years by semiannual drawings (May and November). The bonds will be exchanged for certain outstanding obligations or will be used for public works.

MUNICIPAL LOANS.

The only Peruvian city that has any external debt is Lima, which sold in London an issue of £600,000 5 per cent Provincial Council First Mortgage Bonds. These bonds receive interest January and July, this interest being payable in New York, London, and elsewhere. The bonds sell at approximately 72, yielding slightly more than 7 per cent. The high and low prices since January 1, 1912, were 91¼ and 64½. The loan is secured by a first mortgage on market, abattoir, warehouses, exhibition grounds, etc. The sinking fund is ½ per cent. The other debt of the city amounts to approximately £30,000.

The city of Lima needs additional funds to carry out improvements to its water and sewerage systems. The revenues of the city are below normal for a place of its size; nevertheless, general conditions are excellent, business is flourishing, and the financial situation is fair. The population, which is not far short of 200,000, will probably show a still further increase following the close of the European war. The annual revenue of the city, including £7,000 Government subsidy, is £120,000.

Arequipa, second city of the Republic (population approximately 40,000), is seeking in the United States a loan of £100,000 at 8 per cent for public improvements. The place is of fair importance as a center for the exportation of hides and wool. It is the most important station and the general headquarters of the Southern Railway of Peru.. The city has excellent lighting and traction facilities (see "Public utilities" section of this chapter). At the present writing the city has no bonds outstanding.

Callao has outstanding an issue of 8 per cent sinking-fund bonds, some of which are held abroad. The Anglo-South American Bank is the fiscal agent for the issue. Callao, the chief port, is largely dependent on Lima. Better sanitary arrangements will add greatly to the attractiveness of this port. Plans to improve sanitary conditions are being promulgated at this writing; this may necessitate arrangements for a municipal loan.

None of the other Peruvian cities and towns have any obligations except small local loans and bank debts. Of these cities, Trujillo will probably show the greatest progress, owing to its importance as the center of the sugar industry of the Republic.

BANKS.

There follows a list of banks operating in Peru, the date of their establishment, their capital and reserves, and the value of their shares:

Banks.	Year established.	Capital and reserves Nov. 30, 1916.	Par value of shares.	Value Mar. 15, 1917.
Bank of Peru and London (Banco del Peru y Londres)	1863–1877	[a] Lp809,403	[a] Lp10	[a] Lp11 bid
Caja de Ahorros (Savings Bank)	1868	71,492	....	....
Italian Bank (Banco Italiano)	1889	354,960	10	12¼ bid
International Bank of Peru (Banco Internacional del Peru)	1897	125,503	5	3 1/16 bid
Popular Bank of Peru (Banco Popular del Peru)	1899	214,690	2	2¼ bid
Bank of Deposits and Consignments (Caja de Depósitos y Consignaciones)	1905	119,313	....	....
German Transatlantic Bank (Banco Aleman Transatlántico)	1905	200,000	(b)	(b)
American Mercantile Bank of Peru (Banco Mercantil Americano del Peru)	1916	102,426	(c)	(c)

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[a] The Peruvian libra (pound), which is equivalent in value to the pound sterling ($4.8665) is abbreviated Lp.

[b] Held privately.

[c] Held in the United States.

Dividend payments of certain of these banks are shown in the table on page 343.

The laws governing banking in Peru are virtually those governing general corporation business, and the organization of a bank is not a difficult matter. As conditions exist to-day, it may be said that banking facilities in the country are ample. The establishment in 1916 of the American Mercantile Bank of Peru has filled a long-felt want and has resulted in closer relations between Peru and the United States. The bank is controlled by important American banking interests and has entered on its career with excellent prospects. The head office of the controlling company, the Mercantile Bank of the Americas, is at 38 Pine Street, New York. The directorate in Lima consists of Señores Julio R. Loredo, Felipe Pardo, and Ricardo Salcedo; the manager is Fernando J. Oelmichen. The authorized capital of the bank is Lp1,000,000, of which Lp100,000 is paid in.

The Bank of Peru and London is controlled by Peruvian, French, and British capitalists. It is the oldest and largest bank. In addition to the main office at Lima (a palatial structure), 15 branches have been established throughout the Republic, these being located at Iquitos, Piura, Chiclayo, Pacasmayo, Trujillo, Huares, Huacho, Callao, Cerro de Pasco, Mollendo, Arequipa, Cuzco, and elsewhere. The capitalization of the bank, as stated, is Lp500,000. Dr. Manuel V. Villaren is president and Mr. J. Payen director general.

The Caja de Ahorros is a savings bank and does not handle an ordinary commercial business. The bank pays 4 per cent on six months' deposits and 6 per cent on yearly accounts. This is purely a local institution, with headquarters at Lima.

The Italian Bank, with a capital of Lp200,000, has its principal office at Lima. Branches have been established at Callao, Arequipa, Chincha Alta, and Mollendo. The bank is of Italian origin, its Italian correspondent being the Banco Commerciale Italiano. Profits for the year 1915 were $81,460 United States currency.

The International Bank of Peru, one of the smaller institutions (capital, Lp100,000), showed a profit of $18,698 in 1915. Profits were larger during 1916, as was reflected by a dividend increase from 4 to 4½ per cent.

The Popular Bank, in its statement, also indicated increased prosperity, paying 7 per cent in 1916 on Lp150,000 stock, instead of 5 per cent, the rate paid during 1915. The authorized capital of the bank is Lp200,000. The Popular Insurance Co. is largely controlled by this banking institution and pays annual dividends of 8 per cent on Lp200,000 stock.

The German Transatlantic Bank is indirectly a branch of the German institution with a similar name. The parent organization has a capitalization and reserves of 39,500,000 marks. The local institution is established at Lima, Arequipa, and Trujillo. The bank has a wonderful credit-rating system and prior to the war handled a very large international business.

The Bank of Deposits and Consignments is the official governmental depository. Its profits during 1915 were $81,251.

As a final word it may be said that the general banking situation in Peru at the present time is excellent, reflecting the steady improvement in business and financial conditions throughout the Republic.

INSURANCE COMPANIES.

Peru has at present eight insurance companies of recognized standing. The capitalization and dividend record of six of these companies are shown in the table on p. 343. There are no foreign companies operating in Peru at the present time, despite the comparatively large profits earned by the various companies now in the field. The Rimac and the International companies have been the largest in the field until recently, and are likewise the oldest, having been founded in 1896 and 1895, respectively. The Rimac company has a capitalization of Lp250,000 and the International Lp200,000. Dividends paid by the Rimac company have varied from 30 to 35 per cent per annum (1913 to 1916). In August, 1916, the Urbana Insurance Co. and the Insurance Co. of Peru were consolidated as the Compañías Unidas de Seguros with a capitalization of Lp500,000, which is the largest capitalization of any of the companies in the field. The Italia Insurance Co., closely affiliated with the Italian Bank, was established in 1896; the Popular and the National companies were established in 1904, the former having a capitalization of Lp200,000 and the latter of Lp250,000. El Porvenir, the shares of which are not listed, is capitalized at Lp100,000. Pedro D. Gallagher is president and Dr. Javier Prado y Ugarteche is vice president. The head offices of all these companies are at Lima.

None of the insurance companies domiciled in the United States have entered the Peruvian field. The dividend records of the various companies in the field indicate its attractiveness.

RAILWAY DEVELOPMENT.

Peru has unusually liberal laws to encourage railway building, and is very anxious to grant privileges to interests financially able and willing to carry out construction enterprises leading to the development of the country. Concessions will be granted either perpetually or for a long term of years, usually with renewal privileges, and it is usually stipulated that the lines shall be free from competition during a certain period. Material may be imported free, taxation is exempted, and employees are free at all times from military duties.

The Government has assigned certain taxes and revenues for use in subsidizing railway construction. Despite this fact, however, such construction has been slow in the extreme. Scarcity of population, roughness of country, high cost of fuel and materials, and other causes have combined to check the development in this field. Such lines as have been completed thus far are of a variety of gauges, each individual line serving a district of its own and usually terminating before reaching the slope of the mountains. Only two lines strike from the coast into the mountains. These lines—the Central Railway of Peru and the Southern Railway of Peru—will be discussed hereafter. Aside from these two lines, there is only one railway of importance in the mountains, namely, the Cerro de Pasco Railway, which connects with the Central Railway of Peru at Oroya and runs to the Cerro de Pasco mines and beyond. There are no railways at present leading down the eastern slope of the mountains, where great varieties of tropical wealth exist. Many lines have been projected, usually to connect with the headwaters of the Amazon River. Thus far, with the exception of a few surveys, nothing has been done, although at the present time one section of eastern Peru is within reasonable distance of the Southern Railway at Cuzco. The projected line from Cerro de Pasco to the Rio Ucayali (see p. 333) will probably be the first railroad built into the eastern territory.

One glance at the map of Peru will reveal the lack of railway development throughout the country. The present railway mileage (less than 2,000 miles in operation) is mostly under the control of the Peruvian Corporation, financed with British capital and incorporated in 1890 in the interests of the holders of the external debt of Peru. The history of this corporation is a somewhat familiar story, and will not be repeated here. The concession granted by the Government following the carrying out of certain undertakings on the part of the corporation contained, among others, the following clauses:

> All State railways operated at time of concession shall be leased to the corporation until 1956 without rental, and thereafter for 17 years upon payment by the corporation to the Government of one-half of the net surplus after bond service.
>
> An annuity of £80,000 ($389,325) to be paid for 30 years after July 1, 1907 (as amended), being specially chargeable to the national sugar tax created in 1904.

CAPITAL AND INVESTMENTS OF PERUVIAN CORPORATION.

The total capitalization of the Peruvian Corporation as of June 30, 1916, consisted of (1) £4,975,450 ($24,213,025) debentures bearing interest at 4 per cent fixed and 2 per cent dependent on income; (2) £7,500,000 ($36,498,750) 4 per cent cumulative preference shares, on which upward of 82 per cent in back dividends remained due as of June 30, 1916; (3) £9,000,000 ($43,798,500) ordinary shares, par £1 ($4.87). The first-mortgage debentures are quoted at 83½ per cent, and the preference and ordinary shares at approximately 25 per cent and 5 per cent, respectively.

The following table shows, in pounds sterling and equivalent American currency, the result of the working of the railways and steamers (on Lake Titicaca and the River Desaguadero) for fiscal years ended June 30:

Fiscal years.	Net receipts.		Fiscal years.	Net receipts.	
	Pounds sterling.	U. S. currency.		Pounds sterling.	U. S. currency.
1890–1	£91,772	$446,600	1911–12	£435,552	$2,119,600
1895–6	103,482	503,600	1912–13	438,502	2,133,975
1900–1901	200,759	977,000	1913–14	449,259	2,186,325
1905–6	244,914	1,191,875	1914–15	241,525	1,175,375
1910–11	468,693	2,280,900	1915–16	370,361	1,802,350

It is stated that earnings for 1916–17 were far in excess of the 1915–16 total, indicating larger dividend returns on the preference shares.

The balance sheet of the Peruvian Corporation as of June 30, 1916, stated that the cost of the various properties and concessions acquired under or in connection with the contract for conversion of the Peruvian debt amounted to (net) £12,772,305 ($62,156,425); value of shares and stocks in the Peruvian Central Railway (£1,333,327, or $6,488,-625), the Southern Railway of Peru (£2,224,800, or $10,827,000), etc., amounted to £4,251,513 ($20,690,000); expenditures in respect of reconstruction and extension of the railways totaled £4,859,692 ($23,-649,700); cost of Guaqui-La Paz Railway, £396,320 ($1,928,700). The total investment, including certain additional holdings, amounted to £23,204,844 ($112,926,375).

There follows a brief description of the various railways under control of the Peruvian Corporation:

PERUVIAN CENTRAL (OROYA) RAILWAY.

The Peruvian Central Railway, which bears the distinction of being the highest and most remarkable line in the world, was partially constructed some 40 years ago by an American, Henry Meiggs. The main line extends from Callao and Lima via Oroya to Huancayo. The Callao-Oroya section in the short distance of 106 miles reaches the remarkable altitude of 15,665 feet at Galera Tunnel, cut through the Continental Divide. A branch (10 miles) extends from Ticlio to the mines at Morococha, this branch reaching an altitude of 15,865 feet, the highest point reached by any railway in the world.

The maximum gradient on the main line is approximately 4 per cent. No rack or cog rail is used, the sierras being surmounted by means of a series of 16 switchbacks. The rails are of an average weight of 70 pounds to the yard, the gauge being standard (4 feet 8½ inches). There are 57 tunnels[1] on this section, one of these tunnels exceeding three-quarters of a mile in length. All locomotives use oil as fuel; most of these locomotives and a large proportion of the passenger and freight cars are of American construction. The approximate mileage, including the Ancon branch, not heretofore mentioned, is 249 miles. Gross receipts for 1915–16 amounted to £502,436 ($2,445,100), as compared with £361,837 ($1,760,875) in 1914–15. Net receipts amounted to £222,014 ($1,080,425). The number of passengers carried in 1915–16 was 2,342,093, against 2,300,606 in 1914–15. The amount of freight handled, including 311,038 tons of minerals, totaled 552,743 tons, an increase of 177,631 tons. Mr. J. H. Feehan, Lima, Peru, is the general manager.

The company handles a large local passenger business between Callao, Lima, and Chosica and between Lima and Ancon. Half-hourly train service is maintained between Lima and Callao, and despite competition from interurban tramway lines the trains are heavily patronized. Through service to Oroya is maintained tri-weekly, connections being afforded with the Cerro de Pasco Railway running to the Cerro de Pasco mines, 83 miles from Oroya. Tri-weekly service is likewise maintained between Oroya and Huancayo. Terminal facilities at Callao and Lima are excellent.

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[1] There are on the entire line 65 tunnels and 67 bridges, many of which are marvels of construction. As an engineering feat this railway has never been duplicated.

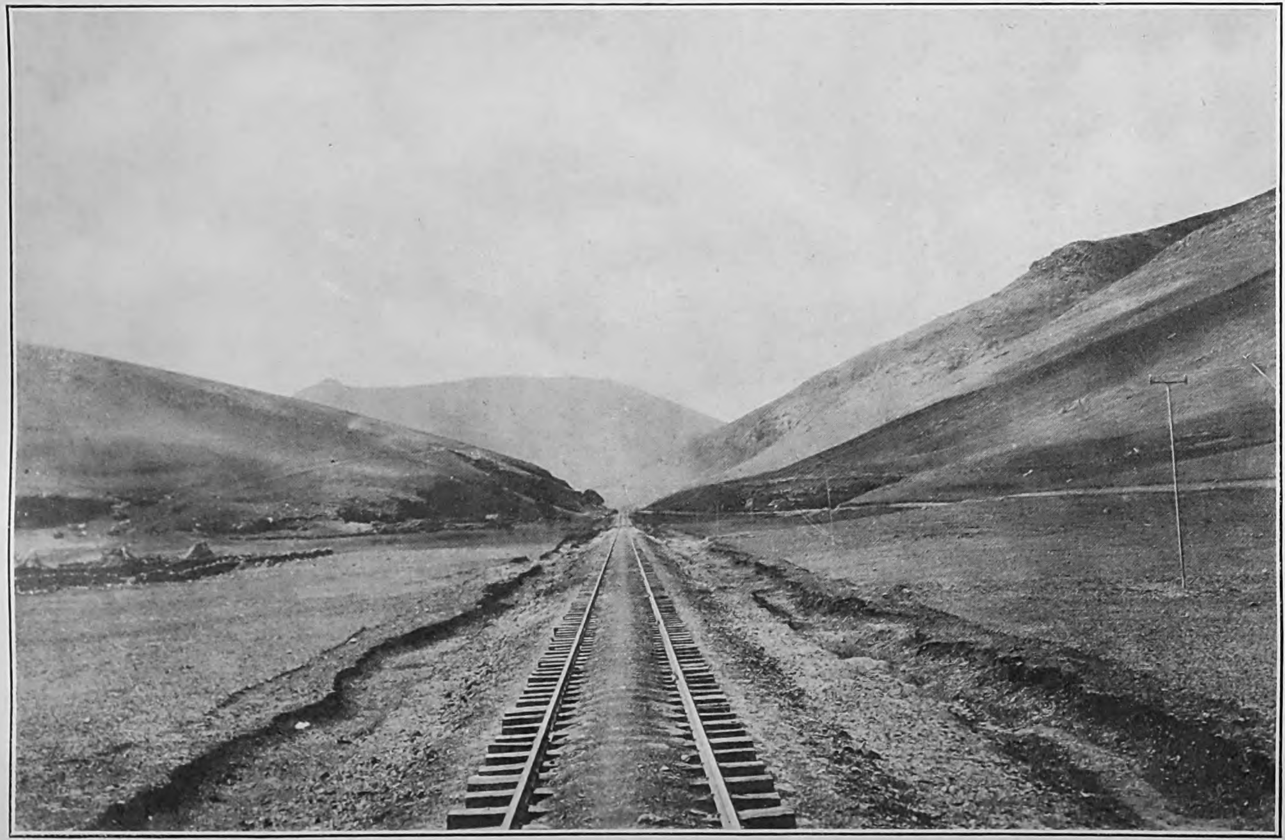


FIG. 19.—VIEW OF CERRO DE PASCO RAILWAY, PERU.

SOUTHERN RAILWAY OF PERU.

The Southern Railway of Peru was also a product of the genius of Henry Meiggs, having been planned and partly constructed by him and, as in the case of the Peruvian Central Railway, completed by Henry Thorndyke, an American. The railway has its Pacific terminal at the port of Mollendo, which, unfortunately, is hardly more than an open roadstead. After a run of about 15 miles along the seashore and flat coastal country the railway begins its climb. At a distance of 107 miles from Mollendo, Arequipa is reached, the altitude at this point being 7,550 feet. Crucero Alto, the highest point of the line (altitude 14,688 feet), is 117 miles beyond Arequipa; the line then descends gradually, the altitude at Puno, the port for Lake Titicaca, being 12,535 feet. The total distance from Mollendo to Puno is 326 miles. From Juliaca, 30 miles from Puno, the Cuzco division strikes off northward for 210 miles. The highest altitude on this division is 14,153 feet. It is believed that at no distant date this division will be linked with the Peruvian Central Railway. From Puno the company runs steamers across the lake, connecting with through trains to La Paz, Bolivia.

The gauge of the Southern Railway is 4 feet 8½ inches; the rails average 60 to 80 pounds to the yard. The passenger fare from Mollendo to Arequipa is $3 gold and to Puno $10, slightly less than 3 cents a mile. From Juliaca to Cuzco the fare is $8.10, equal to about 4 cents a mile. Four or five trains a week are operated between Mollendo and Arequipa, semiweekly trains continuing from the latter point to Puno and Cuzco.

For the year ended June 30, 1916, the gross earnings of the Southern Railway amounted to £256,194 ($1,246,775), compared with £231,634 ($1,127,250) in 1914–15. Gross earnings during 1912–13 reached a total of £356,674 ($1,735,750). Net earnings during 1915–16 were £80,788 ($393,150); in 1912–13, £132,967 ($647,075). The total number of passengers carried in 1915–16 was 208,418, compared with 587,818 in 1912–13, and 622,617 in 1911–12. This very large decrease is due to local tramway competition adjacent to Arequipa and to the completion of the Arica-La Paz Railway. Freight tonnage during 1915–16 amounted to 125,734 tons, this class of traffic being likewise affected by competition arising from the completion of the Arica-La Paz Railway. Most of the cars in use are of American manufacture. A total of 526 miles of main track are operated, this being the longest railway line in the Republic. Approximately 635 miles of extensions are planned.

The Lake Titicaca steamship line earned gross during 1915–16 £22,656 ($110,250), contrasted with £63,967 ($311,300) in 1912–13, this very heavy decrease having been caused principally by the competition on through business resulting from the completion of the Arica-La Paz Railway. There were 8,400 passengers carried during 1915–16. The Guaqui-La Paz Railway in Bolivia, with which the Lake Titicaca steamers connect, is owned by the Peruvian Corporation. Its gross earnings for 1915–16 were £42,470 ($206,675), and net earnings £10,152 ($49,400). In 1912–13 the gross earnings totaled £87,921 ($427,875).

TRUJILLO RAILWAY.

The Trujillo Railway, approximately 75 miles in length, extends from the port of Salaverry via Trujillo and Chocope to Ascope. The line is of 3-foot gauge, 30 to 48 pound rail, constructed without meeting difficult grades, and equipped largely with American rolling stock. The terminal at Salaverry adjoins a mole 1,200 feet in length. A very large business is handled at the port despite the fact that it is little more than a rough, open roadstead. Sugar is the principal commodity, the railway carrying 104,883 tons in 1915–16 and a still larger amount in 1916–17. The total freight tonnage of the railway for 1915–16 was 179,978 tons; 532,546 passengers were transported. Gross receipts for 1915–16 amounted to £66,118 ($321,750), compared with £51,505 ($250,650) in 1914–15. Net receipts for 1915–16 were £27,199 ($132,375). There are four passenger trains daily in each direction between Salaverry and Trujillo and a regular tri-weekly service between Trujillo and the sugar country in the interior.

It is anticipated that the earnings of this line will suffer somewhat following the construction of a railway from the sugar lands to the port of Malabrigo. A mole is to be constructed at the latter port, which is much better situated than Salaverry. The agricultural areas adjacent to the Trujillo Railway are very fertile, and the country is capable of great development. For several years an extension of the line has been projected to climb high into the mountains, reaching the plateau at an elevation of about 12,900 feet. The line would pass through extensive coal fields located at Huayday and would reach the silver and copper mines at Querivilca. The maximum grade for this line would be 6½ per cent, and the cost fairly high. While this line is certain upon completion to secure a large amount of mineral traffic, its construction will probably be delayed, at least for the present.

PAITA-PIURA RAILWAY.

The Paita-to-Piura Railway is a 60-mile line, equipped with American rolling stock, extending from the port of Paita, in northern Peru, to Piura (population 10,000), located some distance inland. The construction cost of the line, completed in 1884, was approximately $1,800,000. Forty-four-pound rails are used, and the maximum gradient is about 2.55 per cent. Gross receipts for 1915–16 were £33,278 ($161,950), and net receipts £14,462 ($70,375); 51,940 tons of freight were handled and 116,480 passengers were transported. Five passenger trains are maintained weekly in each direction. The freight consists mostly of cotton, the territory, largely undeveloped, being highly suitable for the growth of that product. Calacoas (population 20,000), a few miles inland from Piura, is an important center for the manufacture of panama hats, nearly 300,000 being made annually. Large areas of oil and sulphur lands are located near by. An extension to follow the Rio Piura to Catacaos is projected. The distance slightly exceeds 6 miles. There is at present a 3-foot-gauge line, the Piura-to-Catacaos Railway, connecting the two cities. An extension of this line to the town of Morropon has been surveyed. The existing line is laid with 24-pound rails and is suitable only for light traffic. It cost approximately $28,000 to build (6½ miles), and is owned locally.

A railway 450 miles in length has several times been surveyed, to extend from Paita to Calantura or some point from which the Maranhao River is navigable. The line would cross the cordillera at an altitude of about 7,000 feet. From the Maranhao River navigation for steamers is possible to the Amazon River and ocean ports. The construction of the line would greatly shorten the distance between the West Coast of South America and Europe and would open some extremely rich country for development. In the event of the construction of the line the Peruvian Corporation will doubtless operate it.

PACASMAYO-GUADALUPE RAILWAY.

The Pacasmayo & Guadalupe Railway is 63½ miles in length, connecting the port of Pacasmayo with the towns of Guadalupe and Chilete. The port is provided with a pier 2,500 feet long, the harbor being scarcely better than an open roadstead. There is a daily service of passenger trains between Pacasmayo and Guadalupe, beyond which latter point only fortnightly service is maintained. The railway originally extended to La Vina, 11 miles beyond Chilete, but the track was washed away some years ago. In order to make the section beyond Guadalupe pay the line should be carried on to Magdalena, 25 miles beyond Chilete, and thence to Cajamarca, on the summit of the cordillera. Such an extension is contemplated, but in order to avoid floods the line must be located over a route subject to very severe grades.

The gross earnings of the Pacasmayo & Guadalupe Railway for 1915–16 were £22,564 ($109,800), and the net earnings £7,086 ($34,475). Passengers numbered 134,722; the freight handled amounted to 30,476 tons and consisted chiefly of rice and fruit. The gauge of the line is 4 feet 8½ inches, and the equipment is mostly of American make.

CHIMBOTE RAILWAY.

Chimbote, universally spoken of as the best harbor in Peru, is the terminus for the meter-gauge Chimbote Railway, which extends to Tablones, 36 miles inland. The line was opened for traffic in 1872 and was later partially washed away. Following its repair it was operated by the Peruvian Corporation. Earnings are very small, usually less than expenses. In 1915–16 gross receipts totaled £4,458 ($21,700) and net receipts were £300 ($1,450), as compared with a loss of £879 ($4,275) in 1914–15. The continuation of this line inland to Recuay, 100 miles beyond, has long been discussed, the plan being to develop extensive areas producing coal of a quality suitable for briquetting. Conflicting reports concerning the quality of this coal have been published, but it has been claimed that methods exist whereby the product may be made marketable. The coal field was once held under option by the Pennsylvania Railroad. At the present time the small amount of freight handled is derived mainly from sugar plantations belonging to the Peruvian Sugar Co. and from products of a large estate known as Tambo Real. Only one train a week is operated in each direction, the whole future of the property depending on such traffic as may in time be developed from interior points. An extension under different ownership from

Tablones inland toward the Recuay coal fields was partly completed for a distance of about 30 miles (to La Limena) and opened for a small amount of provisional traffic several years ago. It is estimated that an expenditure of $10,000,000 gold would enable any possible purchaser to acquire the present railway mileage and port concession, build the necessary extension, and open the coal fields for development. The altitude at Recuay is about 11,000 feet, and certain fairly heavy grades would have to be surmounted. Beyond this point surveys have been made indicating that it would be possible to build a link to connect with the Cerro de Pasco Railway.

PISCO-ICA RAILWAY.

The Pisco-to-Ica Railway is a 46-mile line, 4 feet 8½ inches gauge, with rail of 60 pounds average weight. The road extends from the port of Pisco in a southeasterly direction through the plain between the Pisco and Ica Rivers, entering the Ica Valley at Guadalupe and continuing to the city of Ica (population 11,000), center of the finest grape country in the Republic. The port of Pisco is equipped with an excellent pier and ranks highest in importance of any port between Callao and Mollendo. The Pisco-to-Ica Railway is the property of the Peruvian Government, is leased to the Peruvian Corporation, and sublet by the latter to private parties at an annual rental of 30 per cent of gross receipts. These receipts for 1915–16 totaled £17,614 ($85,725), of which amount £5,285 ($25,700) accrued to the Peruvian Corporation as rental.

ILO-MOQUEGUA RAILWAY.

The Ilo-to-Moquegua Railway, about 62 miles in length, links Ilo, the most southerly port in the Republic, with Moquegua, capital of the Province bearing that name. Wine, grapes, olives, and similar products are exported from the district adjacent to the line. The railway was constructed between 1870 and 1873, but following the Chilean War (1879–1883) was abandoned and was not reopened until 1907. Two or three years ago arrangements were virtually completed whereby the property would be leased by the Peruvian Corporation for a term of 30 years, but the railway's operations have not as yet been included in the corporation's income account. The company has exclusive railway privileges over an area of 15 miles on either side of its line, and is to construct at a cost of £10,000 ($48,650) a water-supply system for the town of Ilo.

RAILWAYS NOT CONTROLLED BY PERUVIAN CORPORATION.

Probably the most important of the various lines not under the control of the Peruvian Corporation is the Cerro de Pasco Railway, owned by the mining corporation of similar name. This railway runs on the Andean Plateau from Oroya, the junction with the Peruvian Central, to Junin, La Fundacion, Cerro de Pasco, and Goyllarisquisga. The total mileage is 135; gauge, 4 feet 8½ inches; weight of rail 70 pounds to the yard. The equipment consists of 14 locomotives, 270 freight cars, and a number of passenger cars of American manufacture. The main line has an average grade of 1.5 per cent, with a maximum of 3.7 per cent, and cost upward of $2,000,000.

The revenue from operation for the period January 1 to September 30, 1916, amounted to $280,348.

The extension of this line toward the River Ucayali, making connection at Puerta Victoria or at some other port on this navigable affluent of the Amazon, is projected. On various occasions concessions have been granted for the construction of this road, but so far practically nothing has been done other than the making of surveys for possible routes. Its construction will probably be deferred for the present. Various plans have been proposed and various routes have been suggested to furnish the Cerro de Pasco mines an outlet to some port other than Callao. Thus far little actual progress has been made.

The North Western Railway of Peru, gauge 3 feet, extends from Ancon, where it connects with the Central Railway of Peru, northward to Huacho, thence eastward to Sayan; total length, about 130 miles. The railway was to have been extended from Ancon to Lima, but this plan met with opposition on the part of the Government, and it was also found that there was insufficient traffic to make the construction of the extension worth while. The North Western Railway of Peru is an English corporation registered October 31, 1908. Thus far its operation has resulted in a heavy loss, and interest has not been earned on the £1,014,400 ($4,936,575) 5 per cent debentures. Extensions have been projected to the Oyon coal fields and to the port of Suve. Gross earnings of the line for the year 1912–13 were £29,307 ($142,625); they have since increased somewhat. Triweekly passenger train service is maintained between Ancon (connecting with train from Lima) and Huacho, while regular train service is maintained between the latter point and Sayan. The office of the management is at Lima.

MISCELLANEOUS RAILWAY LINES.

None of the railway lines in the Republic not heretofore described have assumed any great importance. There is a 7-mile line known as the Tumbez & Puerto Pizarro Railway connecting Tumbez, the most northerly town of any importance in the Republic, with the port of Pizarro. This is a Government-owned line of 0.75-meter (2.46-foot) gauge and was opened for traffic in 1909. Only a small amount of business is handled at this port, which is not touched at by any of the regular steamship lines maintaining service along the coast. Farther south at the minor port of Bayover a 30-mile meter-gauge (3.28-foot) line known as the Bayover & Reventazon Railway terminates. This railway extends to some sulphur mines owned by the Sechura Mining & Industrial Syndicate and is not operated as a common carrier.

Extending inland from the port of Eten, located a short distance to the north of Pacasmayo, there is a standard-gauge railway 41 miles in length. This railway extends to Chiclayo and Ferrinafe, with a branch from Chiclayo to Patapo. The capital stock is owned locally. Equipment consists of 8 locomotives, 13 passenger cars, and 55 freight cars, and the weight of rail is 54 pounds to the yard. Approximately 125 miles of extensions are projected; these, however, are of 3-foot gauge. Some construction difficulties will have to be overcome and grades on the extensions will be fairly heavy. In one part of the existing Chiclayo-to-Patapo line the grade reaches 6 per cent. This company publishes no statement of earnings and expenses. Recently it acquired the assets of the Pomalca Railway, formerly owned by the Sociedad Agrícola Pomalca, connecting a large agricultural estate with Eten. The former management held and transferred certain valuable concessions for the construction of additional mileage.

A number of short spurs or lines extending to plantations and mines have been built in various sections of the Republic. Some of these are classed as common carriers; none of them are of much importance. A most comprehensive construction program has been laid out for the future, which, if carried into effect, would cause the rapid development of the country's vast agricultural and mineral resources and would open to the outside world the almost limitless areas of virgin territory lying on the eastern slope of the Andes.

PUBLIC UTILITIES.

In the public-utility field Peru has shown excellent progress. Most of the important cities and towns have water and electric light and power systems, while telephones connect many sections of the Republic. Tramway systems traverse the streets of Lima, Callao, and towns adjacent thereto, and also are established at Arequipa. Lima is also provided with a gas service, which, however, has not been well patronized during recent years.

IMPORTANT COMPANIES IN LIMA-CALLAO DISTRICT.

The most important public-utility company in Peru is the Empresas Eléctricas Asociadas of Lima (Lima Light, Power & Tramways Co.), controlling the electricity and gas franchises in and adjacent to Lima, as well as more than 86 miles of tramway. The £1,091,460 first-mortgage 5½ per cent bonds are listed on the London Stock Exchange and on the Lima Bourse. They form part of an original issue of £1,200,000 bonds, retirable by sinking fund. This sinking fund was suspended for two years commencing 1914 and has only recently been resumed. Earnings from electric light and power service for the year 1915 amounted to $751,023 as compared with $741,790 in 1914; net revenues totaled $505,972 ($523,562 in 1914). Tramway earnings amounted to $997,640 in 1915 ($997,712 in 1914); net revenues totaled $383,487 ($412,247 in 1914). Freight railways produced a revenue of $131,371 in 1915 and were run at an expense of $146,242. On December 31, 1915, 127 tramway cars were in service, many of familiar American makes. The surplus earnings of the company after fixed charges, depreciation, bad debts written off, etc., amounted in 1915 to $145,951. Total gross earnings from all sources were $1,880,085. The total amount of stock outstanding as of March 15, 1917, was Lp1,500,003, on which dividends have been paid in recent years as follows: 1906, 3 per cent; 1907, 6 per cent; 1908, 6 per cent; 1909 and 1910, 4½ per cent each; 1911, 5½ per cent; 1912, 5¼ per cent; 1913, 4¼ per cent; 1914, 1 per cent for first quarter; 1915, none; 1916, 2 per cent for last portion of year.

The Peruvian Telephone Co. (partly local and partly British capital) furnishes the telephone service for Lima, Callao, and near-by places.

PUBLIC-UTILITY ENTERPRISES IN AREQUIPA.

Arequipa, the metropolis of southern Peru, is located at a distance of about 665 miles from Lima and is the center of a productive and somewhat important district. The city has a population slightly in excess of 40,000, and its altitude is approximately 7,550 feet.

The water supply of the city, drawn from the near-by mountains, is furnished by the municipality and represents one of its principal forms of income. Several mineral springs, two of which are widely known throughout South America, furnish the drinking water used by the upper classes generally.

Electricity for light and power is furnished by the Sociedad Eléctrica de Arequipa (Ltd.), a local company that has been very successful. The company's power station is located at Charchani, on the River Chile, about 8 miles from the city, near the base of Mount Charchani (altitude of mountain approximately 19,500 feet). Upward of 27 miles of circuit are in use. The capitalization of the company amounts to $375,000 United States currency, and reserves total $97,140. Materials and current assets on hand as of December 31, 1916, indicated an excellent financial condition. Gross earnings for the calendar year 1916 totaled $114,201, and expenses, including extraordinary repairs, amounted to $34,270. The net surplus was $79,931, from which a dividend of $45,000 (12 per cent) was paid to the shareholders. Dividends during recent years have averaged from 10 to 12 per cent per annum. Shares, although not quoted, are worth more than par, and are held by 55 stockholders. Señor M. Ugarteche, Arequipa, is the director-general.

The traction service of the city is controlled by the Tranvía Eléctrico de Arequipa (Ltd.). The total authorized length of the system, including a series of belt lines and an extension to the town of Tingo, is 10 miles. Thus far the operations of the line have not proved as successful as was anticipated, and the road is operated at the present writing by W. R. Grace & Co. as agents for the Bondholders' Syndicate, consisting of W. R. Grace & Co., the Italian Bank, the Bank of Peru and London, etc. There are outstanding at the present time £67,500 of an authorized issue of £75,000 8 per cent bonds, these being listed on the Lima Stock Exchange. The company does not make public any statement of operating results. Rates of fare in the city are very low, the belt line charging 2½ cents gold within the city limits. The rates to Tingo are 7½ cents first class and 5 cents second class. The manager of the company is an American, and American equipment is used.

The city is provided with an excellent telephone system, which serves the surrounding country and connects with through trunk lines to Mollendo and other sections of the Republic. The Mollendo extension is owned by the operating company, which is known as the Empresa de Teléfonos Arequipa y Mollendo. The holder of the concession is Gustavo Llosa, of Arequipa, who, it is stated, owns the entire stock of the company. Subscribers number about 500.

There is no gas company in the city, and it is hardly likely that one would pay.

MINING ENTERPRISES.

Peru, long the Eldorado of the Spanish Conquistadores, exported during the days of Spanish occupancy enormous quantities of gold, silver, and copper. To-day, so far as gold is concerned, the country occupies an insignificant position among the nations of the world; nor does it occupy a prominent position as a silver producer. These valuable minerals are to-day mined mainly as by-products. Copper is king in Peru, and most of the copper is produced by three mines only, namely, the Cerro de Pasco Copper Co., the Backus & Johnston mine, and the Morococha mine. The Cerro de Pasco Co.'s mine is described in the Appendix (p. 521). The property produced during the period from its discovery to the year 1900 no less than 40,000,000 tons of silver and copper ore. The Morococha mine is under Cerro de Pasco control.

During 1916 a total of approximately $1,200,000 of gold was mined in Peru, as compared with about $490,000 in 1911. About one-half of this gold was produced at Cerro de Pasco, the remainder being widely distributed. The principal gold mines are the New Chuquitambo (capital, Lp50,000; see Appendix); the Santo Domingo, controlled by the Inca Mining Co.; Aporama Goldfields (Ltd.), etc. Gold statistics in this country are very difficult to obtain, it being almost impossible to trace the amounts secured by Indians.

Probably the most important silver mine in the Republic is that owned by the Anglo-French Ticapampa Silver Co., located near the port of Huarmey, with which it is connected by a short stretch of light railway. Dividends paid by this company have averaged from 20 to 25 per cent per annum. The capitalization as of recent date was 2,500,000 francs. The entire directorate is French. The Morococha mine produces large amounts of the mineral. Its production during recent years has been as follows: 1911, 230,132 ounces; 1912, 431,226 ounces; 1913, 549,795 ounces; 1914, 608,322 ounces; 1915, 874,000 ounces; 1916 (estimated), 1,500,000 ounces. Now that silver is enjoying such a high price in the world's markets, there is likely to be a boom in the white metal in the Republic of Peru, and the country will probably again occupy a very high place as a producer.

The copper production in Peru for three recent years, according to a statement by American Consul General Handley, has been as follows (long tons, 2,240 pounds): 1913, 27,328 tons; 1914, 25,070 tons; 1915, 31,890 tons, fine copper. Copper exports from Callao totaled $14,198,799 in 1915. A small amount of copper was also exported from Salaverry. The copper reserve of the Cerro de Pasco properties is estimated at 253,452,000 pounds.

Coal is mined in large quantities at Goyllarisquisga, at or near which place the Cerro de Pasco Mining Co. holds 108 coal-mining claims. Coal reserves at these mines are estimated at 3,052,903 tons. Practically all of this coal is used at the Cerro de Pasco mines and smelters. Coal also exists at Oyon, Checras, Recuay, Hutunhuasi, near Oroya, and at other places. Exploitation of these mines has been much discussed, although little has thus far been done to develop them. It is not certain that all or any great part of this coal is of commercial value.

Borax exists in large quantities near Arequipa, and it is expected that the Borax Consolidated (Ltd.), which owns the deposit, will begin extensive development in the near future. Other minerals in Peru are tungsten, lead, mercury, vanadium, bismuth, salt, molybde-

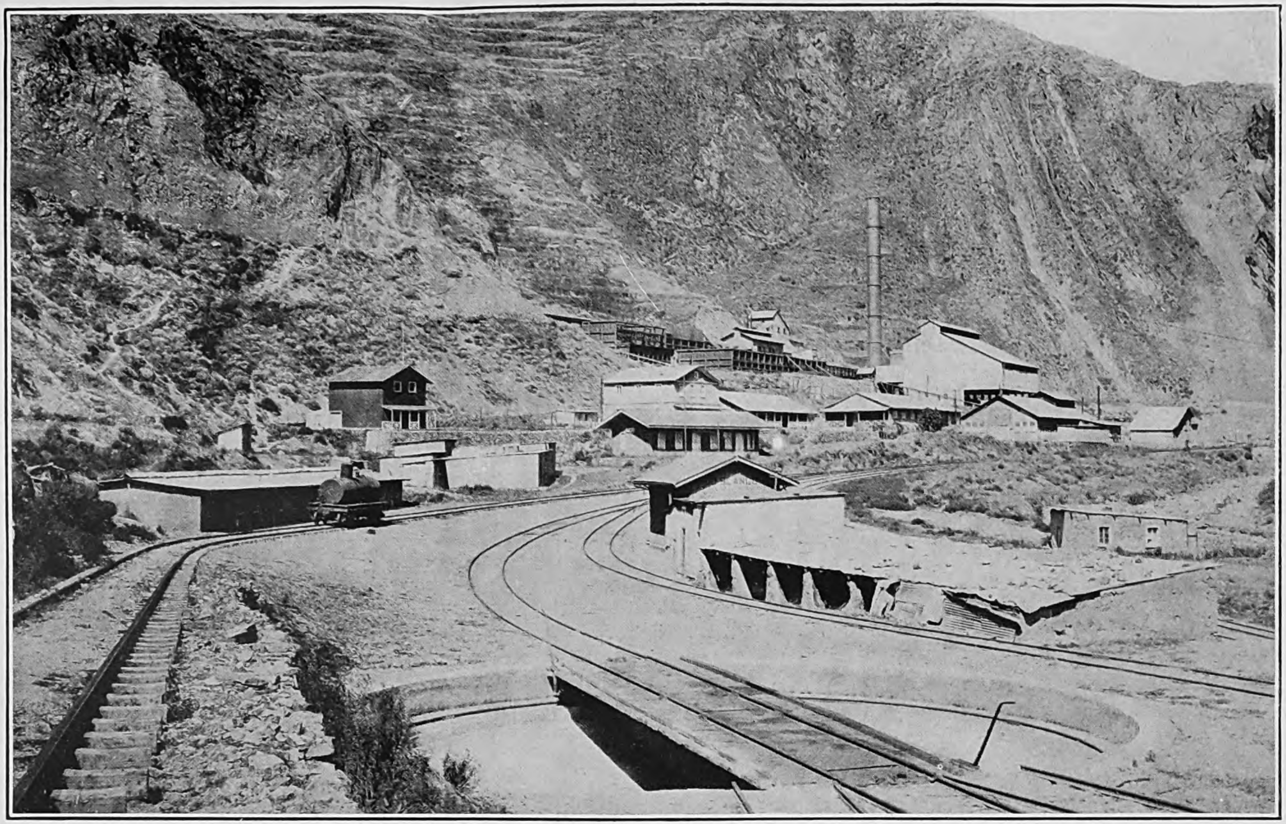
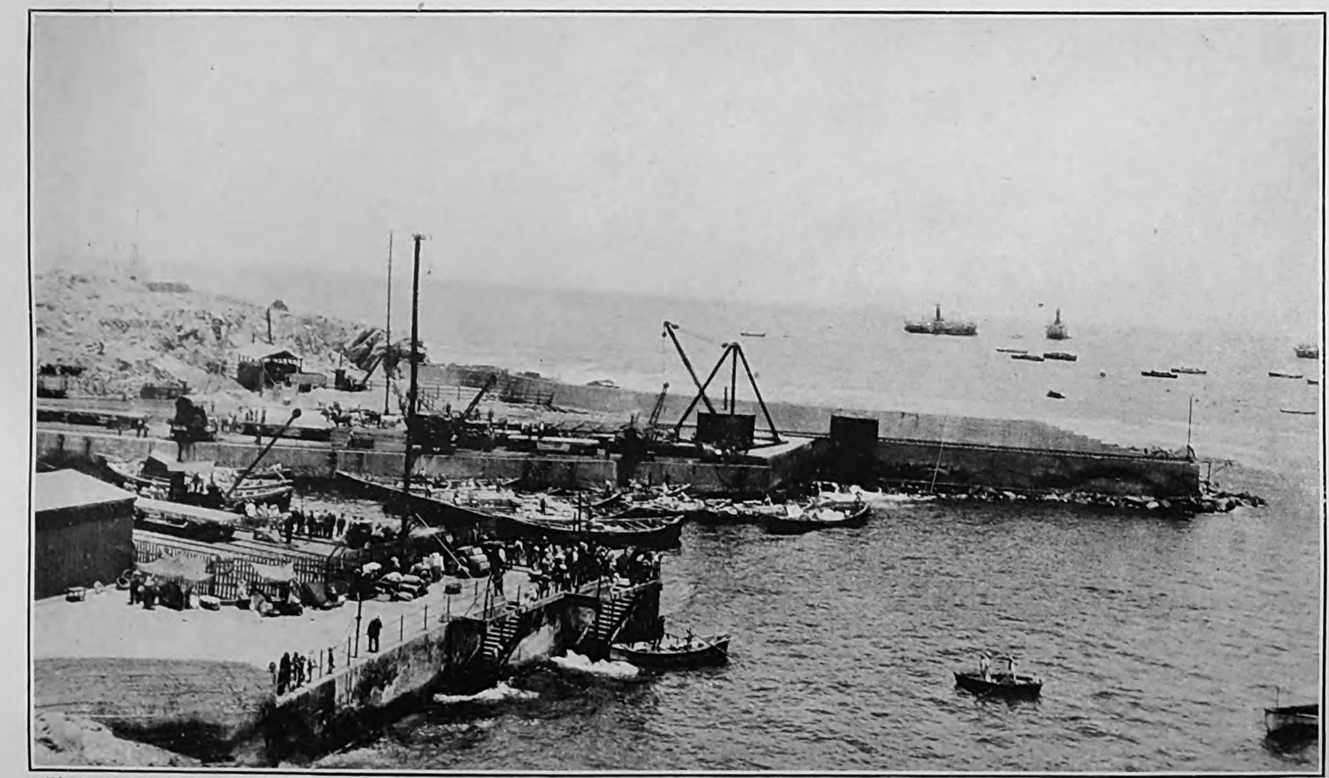


FIG. 20.—BACKUS AND JOHNSTON SMELTER AT CASAPALCA, PERU.



Photograph by P. S. Penfield.

FIG. 21.—PORT OF MOLLENDO, PERU.

num, antimony, and zinc. None of these minerals are now mined in any considerable quantities.

Gold is taxed £10 per kilo in dust or bar and £2 per kilo when contained in other minerals. Silver pays 1s. per kilo at a fixed parity of 23½d. per ounce; 2½d. per kilo is payable for each advance of 1d. per ounce in the price of the metal. At the present price of silver the tax received by the Government exceeds 3s. 6d. per kilo. The copper tax is 15s. per ton when the price does not exceed £65 per long ton. For all advances above that price the tax amounts to 10 per cent of the increased price. There is likewise a duty on all imported material and supplies.

The following table gives the estimated value of Peruvian minerals produced in 1915 and 1916:

Minerals.	1915	1916	Minerals.	1915	1916
Gold	$1,114,540	$1,206,298	Antimony	$43,161	$134,038
Silver	4,526,765	6,483,398	Borates	19,855	67,741
Copper	11,909,673	23,359,200	Salt	87,646	88,804
Lead	129,483	151,825	Mineral waters	5,957	12,371
Mercury	1,946	6,137	Coal	1,016,563	772,260
Zinc	973	1,747	Petroleum	8,210,470	7,418,804
Vanadium	1,438,683	1,352,497			
Molybdenum	344,889	1,059,840	Total	28,857,587	42,129,073
Tungsten	6,983	14,113			

THE PETROLEUM INDUSTRY.

Extensive petroleum deposits exist in Peru and are being exploited, largely in the Province of Paita and in other parts of the northern coastal lands. The International Petroleum Co., controlled by Standard Oil Co. interests, has taken the lead in the development of this field and has acquired some of the most important oil companies formerly operating independently. In addition to large amounts of this petroleum annually exported, a market exists locally, considerable amounts being annually used by the various railways of Peru, the Peruvian Steamship Co.'s vessels, the sugar mills, and various manufacturing enterprises.

Oil has also been discovered near Puno on Lake Titicaca. Although this field has been widely discussed in the past, very little development has taken place. A ready market would be found for the product in the Republic of Bolivia. Petroleum exports of Peru for 1913 were valued at $1,616,006; for 1914, $1,202,697. The total production of petroleum in Peru in 1915 amounted to 285,000 tons, compared with 252,666 tons in 1914.

There follows an interesting discussion of the petroleum resources of Peru by Frederick G. Clapp, S. G.:

DISTRIBUTION OF PERUVIAN FIELDS.

Ralph Arnold has grouped the Peruvian fields into two general districts, as follows:

(A) That of the Andes, which contains the—

1. Titicaca field; and

(B) The Pacific coast district, which includes the following—

2. Zorritos field.

3. Lobitos field.
4. Negritos field.

In accordance with our own practice, we might more properly speak of the Zorritos, Lobitos, and Negritos fields as "pools," since they all lie in the Department of Piura, but this distinction is unimportant for practical purposes. Arnold quotes C. M. Hunter as giving (in a personal letter) the total area of oil territory in Peru as over 5,000 square miles, of which 100 square miles have oil possibilities and 200 square miles are proved. In 1915 there were 524 wells in the whole country, of which 90 had been sunk the previous year.

Petroleum is also found in the districts of Pirin, Chimbote, Jauja, Huancavelica, and Ica; in fact, it is said to occur at frequent intervals from Tumbez all the way to Lake Titicaca. In 1915 the following petroleum companies were operating in the country:

Bayovar Oil Development Co. (Ltd.), owning 558 pertenencias (claims) near Paita, but not having started operations.

Establecimiento Industrial de Petroleo de Zorritos, owning fields of 17 square miles at Zorritos, 27 wells producing. The output in 1913 was 3,500,000 gallons. It has a refinery at Zorritos.

Lagunitas Oil Co. (Ltd.), owning 8 square miles, and situated 11 miles from Talara, under lease for 35 years from the London & Pacific Petroleum Co. The 1915 output exceeded 2,500 tons a month.

Lobitos Oilfields (Ltd.), owning 11,000 acres between Lobitos and La Cruz; also owning stores and three tank steamers. The production has been as follows:

	Tons.
1911	52, 172
1912	78, 272
1913	74, 314

London & Pacific Petroleum Co., owning extensive leases in the Province of Paita, partly subleased to the Lagunitas Oil Co. It also owns a fleet of tank steamers and has a refinery at Talara.

Titicaca Petroleum Co., operating in the Titicaca field.

West Coast Fuel Co. (Ltd.), owning storage tanks, pipe lines, etc., at Paita and Callao.

A. CENTRAL (ANDEAN) DISTRICT.

Oil is found at several points in the Andes, as in the Huallanca region, in Cerro de Pasco, and in the Provinces of Jauja and Parinacochas. The principal known deposits are near Lake Titicaca.

1. *Titicaca field.*—This field is situated in the district of Puno, 300 miles (482 kilometers) from the Coast, 8 miles (12 kilometers) distant from Lake Titicaca, high in the Andes, and near the Bolivian frontier, extending from Cuzco to the boundary of Bolivia. The deposits are found in the Provinces of Canas, Lampa, Azangaro, and Huancane. Exploration was most extensive in the region of Pirin, in the district of Pusi, Province of Huancane, about 5 kilometers northwest of the town of Pusi. The work has been done by the Titicaca Petroleum Co., a United States corporation, which discovered oil in 1906. and which in 1912 had sunk 10 wells reported producing an average of 50 barrels per day, the oil being paraffin base. The Pirin and Corapata localities are only a short distance from Juliaca Station of the Southern Railway near the Bay of Escallani on Lake Titicaca. At Corapata a company composed of Peruvian and Chilean capitalists has carried on exploration work. The Titicaca field now appears to be abandoned.

B. PACIFIC (COASTAL) DISTRICT.

The coastal belt extends southward through a desert waste of 2,000 miles (3,218 kilometers) from the Ecuadorean frontier to Chile. The developed fields, however, extend only from the town of Tumbez, south of the Gulf of Guayaquil, for 180 miles (289 kilometers). to and beyond Paita, being bounded on the east by spurs of the Andes Mountains, and on the west believed to include the Islands of Lobos. The field is said to be about 30 miles (48 kilometers) wide, and occupies the Province of Tumbez and the northern part of the Province of Piura, but English experts believe it will prove to be 150 miles (241 kilometers) wide east and west.

The fields are situated between the hills of Illescas, south of the port of Paita, in the Department of Piura, and the town of Tumbez, in the north of the Province of the same name bordering on Ecuador. The eastern boundary is considered to be the chain of foothills of La Brea or Amotape, constituting outliers of the Andes.

The coastal fields have little vegetation. Rain seldom falls, but the temperature is said to be ideal. All water used is condensed sea water. Wells range from 250 to over 3,000 feet (76 to 914 meters) in depth.

The best geographic description of the Pacific district of Peru is given by Deustua, a writer in the Mining Journal, who says that there are two great regions: the eastern, comprising the La Brea chain of mountains and other spurs of the western Cordillera of the Andes; and the western, which is smooth, and lies along the coast, and includes a series of plateaus. The mountain region forms the eastern boundary of the coastal plains and of the oil-bearing formation of the Provinces of Tumbez and Paita. The plateau to the north of Paita has an elevation of from 50 to 150 meters (164 to 492 feet), but farther south it almost declines to sea level.

2. Zorritos field.—The Zorritos field is the oldest and the most northern in Peru. It is situated only about 24 miles (38 kilometers) south of Tumbez, south of the Gulf of Guayaquil. The producing territory extends along the coast for about 4 miles (6 kilometers), most of the wells being drilled at the water's edge and some in the edge of the ocean. The Zorritos field is owned by Faustino G. Piaggio & Co., of Callao, whose property in 1910 covered 2,160,000 square meters, not all situated in this field, however.

The greatest depth known to have been reached in the Zorritos field is 3,020 feet (920.5 meters) in Peroles ravine; but most wells are between 600 and 2,000 feet (182 and 609 meters) deep. The productions run in some cases as high as 500 to 600 barrels per day; one-third of all the wells drilled have been failures.

3. Lobitos field.—Next south is the Lobitos field in the Department of Piura, about 60 miles (96 kilometers) north of Paita. The proved area of this field is about 25 square miles (64 square kilometers). It is owned by the Lobitos Oilfields (Ltd.). This is the district of second largest production in Peru. The cost of wells 3,000 feet (914 meters) deep averages about $10 per foot, as against $1.50 or $2 per foot for wells under 1,500 feet. The deepest well in the field was sunk to a depth of 3,435 feet without success, requiring 18 months to drill. All the wells are over 2,000 feet deep. The shallower ones in this field have been short-lived, but the deeper sand favors greater expectations. In 1915 a new pool was reported opened at Punta Restin, 12 miles north of Lobitos.

4. Negritos or Talara field.—The southernmost and richest of the developed coastal areas is the Negritos field, situated 40 miles (64 kilometers) north of Paita, in the Hacienda La Mina Brea and Parinas. The area of this field is about 650 square miles (1,683 square kilometers). Negritos is the center of drilling operations, and Talara, 16 miles distant, where the refinery and wharves are situated, has an excellent harbor, which is connected with the field by a 6-inch pipe line and 16 miles of narrow-gauge railway. At a point 11 miles east of this field is an asphalt seepage called "La Brea." In the Negritos field the first company to operate was the London & Pacific Petroleum Co., the holdings of which covered 650 square miles. The average depth of the wells is 2,500 or 3,000 feet, and the most important oil deposits are below 1,500 feet.

SURFACE INDICATIONS.

The surface indications in Peru consist of:

1. Asphaltic and petroleum-saturated limestones, clays, etc.
2. Association of bitumens with ore deposits.
3. Bituminous dikes.
4. Oil seepages.
5. Submarine petroleum springs.

STATISTICS OF PRODUCTION.

The following table shows the production of crude petroleum in Peruvian fields, in barrels. The figures are in part from "Treatise on Petroleum," by Sir Boverton Redwood (1913), 3, 109; in part from Thompson's "Petroleum

Mining," 32, and in part compiled by Miss Anna B. Koons of the United States Geological Survey:

Years.	Zorritos.	Lobitos.	Negritos.	Titicaca.	Lagunitos.	Total.
	Barrels.	*Barrels.*	*Barrels*	*Barrels.*	*Barrels.*	*Barrels.*
1896	47,536					47,536
1897	68,452		2,379			70,831
1898	68,571		97,292			165,863
1899	89,166		145,938			235,104
1900	102,976		217,036			320,012
1901	74,647		239,488			314,135
1902	59,273		205,810			265,023
1903	49,047		269,424			318,471
1904	49,547		295,617			345,834
1905	37,720	[a] 75,000	335,160			447,880
1906	42,419	162,000	330,510	1,365		536,294
1907	65,476	279,000	396,750	15,000		756,226
1908	71,429	319,898	543,750			1,011,180
1909	70,750	429,195	740,070			1,316,118
1910	107,000	400,080	773.025			1,330,105
1911	64,286	391,290	882,698			1,368,274
1912	78,095	587,048	1,071,000			1,751,143
1913	83,343	557,355	1,036,490		346,073	2.133,261
1914	88,136	504,743	1,032.210		282,713	1,917,802
1915	72,736	664,972	1,355,925		392.618	2,487,251

[a] Estimated.

GUANO GATHERING.

Guano, once the most important export from Peru, is no longer a source of any considerable revenue to the Republic. The Peruvian Corporation, in accordance with agreements between the Peruvian Government and the bondholders made at the time of the formation of the corporation, was allotted 2,000,000 tons of this guano to be shipped over a period of years. Up to 1915 the Peruvian Corporation, according to official audits, had shipped 1,237,128 tons of this guano. Recent decrees of the Government confined the operations of the corporation to certain islands and restricted areas, against which the corporation and the British, French, and Dutch Governments have officially protested. The Peruvian Corporation, owing to existing conditions, made no shipments during 1916.

In addition to the Peruvian Corporation, an independent guano-gathering concern exists; this is under German control.

AGRICULTURE.

Sugar is the leading agricultural product of Peru and as an article of export is bringing considerable wealth to the nation. Despite abnormal freight charges and lack of ship tonnage, Peruvian sugar is finding its way to Europe and other parts of the world. Chile buys large quantities of it, while considerable amounts are used for home consumption. It is the writer's belief that the sugar industry will be the backbone of the future development of the country. Already large sums of British and German capital have been invested in the sugar plantations, and as soon as the war is over additional sums will follow. Production costs are low. The sugar plantations are located mostly in the irrigated country west of the mountains, although a number of plantations exist on the eastern slope. The sugar acreage exceeds 100,000. Salaverry is the leading sugar port at present, and Trujillo is the center of the industry. Splendid sugar country is found near the port of Chimbote, but better irrigation facilities are needed.

The Peruvian Sugar Co. (Ltd.) has important plantations near that port.

Statistics follow indicating the area of sugar lands under cultivation and the production of sugar and "chancaca," alcohol, and rum:

Years.	Area under cultivation.	Production of sugar and chancaca.	Production of alcohol and rum.
	Acres.	*Metric tons.*	*Gallons.*
1911	86,879	178,533	2,050,965
1912	91,747	192,754	2,405,406
1913	97,745	183,954	2,346,772
1914	100,641	228,055	2,869,165
1915	105,770	262,840	2,673,666
1916	100,650	276,000	....

Employees in the sugar plantations numbered 16,977 in 1911, 19,945 in 1912, 20,942 in 1913, 21,881 in 1914, and 24,433 in 1915. While no 1916 statistics are as yet available, it is said that more than 25,000 men and women are at present employed in the industry. The average daily wage paid to employees was (year 1913) 1.25 soles ($0.60 United States currency). It is stated that the production cost of Peruvian sugar averages less than $25 per metric ton in plantations where up-to-date equipment is used and about $30 per metric ton under old-fashioned methods. The production of cane per acre is almost double that of Cuba, and labor costs infinitely less. Warehousing and storage costs are almost nil, owing to the fact that practically no rain falls in the coastal lands. When additional steamship tonnage is obtainable, the industry will advance with rapid strides. The field is worthy of investigation.

Cotton raising is another important industry in Peru, particularly in the northern coastal valleys adjacent to the port of Paita. A total of 46,571,797 pounds of cotton was exported in 1915, as compared with 53,491,774 pounds in 1914. The value of the 1915 exports was $6,165,252. In addition there was exported, in 1915, 13,222 tons of cotton seed and 7,299 tons of cottonseed cake, the value of these commodities being $898,269. Chile and Great Britain took most of the cotton seed and cottonseed cake. High freight rates and the low price until recently prevailing for cotton has greatly injured this industry in Peru. Home consumption is quite large, however, there being several cotton mills of importance in the Republic, one of which, the Peruvian Cotton Mill Co. (Ltd.), is capitalized at approximately $500,000. This company paid 10 per cent in dividends during 1916. Approximately $2,500,000 has been invested in the milling industry. It has been pointed out to the writer that a cottonseed-oil factory would do a good business in Peru. A total of about 6,500,000 pounds of raw cotton was used by the mills of Peru during 1915. A large portion of the cotton produced in Peru is similar to that grown in the irrigated regions of Egypt. It is mostly of a long fiber used largely to mix with wool used in underwear, stockings, etc., the resulting fabrics being very durable and showing little tendency to shrink. The average length of the Peruvian cotton fiber, as compared with other cotton fibers, is as follows: Sea Island (a small amount of this is raised in Peru), 1.61 inches; Egyptian, 1.41 inches; Peruvian, 1.30 inches; Brazilian, 1.17 inches; American upland, 1.02

inches; and Indian, 0.89 inch. Fair amounts of British capital, as well as considerable sums of German money, have been invested in the cotton industry.

Tobacco is raised in fair quantities, largely in the northern Provinces of Tumbez and Huancabamba. Large amounts are also imported, mostly from Ecuador. The National Tax Collecting Co. has a monopoly on this enterprise and manufactures or imports all the cigars, cigarettes, and similar products sold in the Republic. A total of 370,000,000 cigarettes were manufactured during 1915. Receipts from the tobacco monopoly for that year exceeded $2,280,000.

Rubber is the one product of commercial importance of the eastern montaña region of Peru, all of this being gathered near the numerous affluents of the upper Amazon River and shipped in small steamers or flatboats to Iquitos, where it is transshipped to ocean steamers destined for ports of Europe and the United States. The exports of this commodity from 1908 to 1912 averaged from 4,500,000 to 5,500,000 pounds, and the trade of the rubber district during this period of prosperity averaged between $20,000,000 and $30,000,000 per annum. Following the rubber crash of 1913–14 the importance of this industry declined. Exports for 1913 were $3,970,159; for 1914, $2,169,445; for 1915, $2,937,891; for 1916, $3,391,459. The recent advance in the price of rubber will doubtless help to revive the industry, but it is not likely that it will regain its former importance for some time to come.

Hides, leather, and wool are also important products of the country. Arequipa is the center of this industry.

LOCAL ENTERPRISES IN THE REPUBLIC.

As a general illustration of development along local lines, there follows a brief description of the activities of the bourse at Lima.

As of March 15, 1917, there were listed on the bourse at Lima, Peru, 59 securities of a par value of Lp12,933,201. These included bonds and cedulas of a par value of Lp5,490,285; stocks of banks, national tax-collecting companies, insurance companies, and agricultural societies of a par value of Lp5,275,000; and stocks of mining, manufacturing, steamship, public utility, and other companies of a par value of Lp2,167,916. Of the 20 bonds and cedulas listed (not including internal obligations of the Republic of Peru), 6 bear interest at from 5½ to 7 per cent, 13 at 8 per cent, and 1 at 9 per cent. All of these bonds were obligations of local enterprises.

There are listed on the bourse stocks of 36 enterprises, all Peruvian, of which no fewer than 29 usually receive dividends. The highest dividend paid during 1916 by any of the local institutions whose securities are listed was 40 per cent, this being distributed by the Compañía Internacional de Seguros del Peru. The shares of this company are quoted at 570 per cent of par bid; none offered. Shares of the Compañía de Seguros Rimac, on which 30 per cent was paid last year, are quoted at 550 per cent bid. The most widely distributed shares are those of the Compañía Recaudadora de Impuestos, the National Tax Collecting Co., capitalized at Lp1,500,000, par value Lp10, of which Lp9 is paid in. These shares are quoted at approximately Lp8.80@Lp9.

While there are a number of brokers executing orders on this bourse, it is hardly likely that many of them would be equipped to handle foreign orders. Any of the Peruvian banks would handle transactions and ship securities. Commissions are nominal.

The following table shows the dividends paid by the principal Peruvian companies during 1915 and 1916:

Companies.	Capitalization.	Dividends paid.	
		1915	1916
BANKS.	*Peruvian pounds.*	*Per cent.*	*Per cent.*
Banco del Peru y Londres	Lp500,000	3	(a)
Banco Italiano	200,000	7	10
Banco Internacional del Peru	100,000	4	4½
Banco Popular del Peru	200,000	5	7
Crédito Hipotecario del Peru	50,000	12	14
TAX-COLLECTING COMPANIES.			
Compañía Administradora del Guano	30,000	10	[b] 5
Compañía Salinera del Peru	100,000	12	12
Compañía Administradora de los Almacenes Fiscales	100,000	10	10
Compañía Recaudadora de Impuestos	1,350,000	8.9	8.9
INSURANCE COMPANIES.			
Compañía Internacional de Seguros del Peru	200,000	40	40
Compañía de Seguros Rimac	250,000	30	30
Compañía de Seguros Italia	200,000	10	15
Compañía de Seguros La Nacional	250,000	....	7
Compañía de Seguros La Popular	200,000	8	8
Compañías Unidas de Seguros	500,000	....	30
AGRICULTURAL SOCIETIES.			
Sociedad Agrícola San Nicolás	[c] 160,000	16	[b] 6
Sociedad Ganadera de Junin	110,000	13	(a)
Sociedad Agrícola Paramonga	400,000	15	(a)
Ingenio Azucarero Corpacancha	30,000	8	8
Sociedad Industrial La Estrella	110,000	....	....
Ingenio de Huaura	35,000	....	....
MANUFACTURING COMPANIES.			
Peruvian Cotton Mill Co	100,000	....	10
Fábrica de Sombreros "Fenix"	9,963	8	(a)
TRANSPORTATION COMPANIES.			
Empresa del Muelle de Tambo de Mora	25,000	11	(a)
Peruvian Steamship Co. (Cía. Peruana de Vapores)	[c] 300,000	....	16
PUBLIC-UTILITY COMPANIES.			
Empresa del Agua de Barranco	20,000	6	6
Empresa del Agua de Miraflores	8,000	....	6
Empresa del Agua del Paita y Colan	6,000	8	[b] 4
Empresa de Agua Potable de Piura	10,000	3	(a)
Empresas Eléctricas Asociadas	[c] 1,500,000	....	[b] 2
Sociedad Eléctrica de Arequipa	375,000	10	12
Peruvian Telephone Co. (Ltd.)	....	....	5
Lima Railways (Ltd.)	[c] 400,000	1½	1¾
MINING COMPANIES.			
Cerro de Pasco Mining Co	(d)	....	(d)
New Chuquitambo Gold Mines (Ltd.)	50,000	3¾	[b] 5
MISCELLANEOUS COMPANIES.			
Peruvian Corporation (preference)	7,500,000	1	¼
Municipal Theater Co. (Lima)	[c] 7,650	....	6
Compañía Urbana Cocharcas	20,000	16	16

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[a] Dividend not declared to Mar. 15, 1917.

[b] For a portion of year only.

[c] Company also has bonds outstanding.

[d] The Cerro de Pasco Co. is capitalized in a manner unlike any of the other companies listed here. It has issued 666,666 shares without par value, on which dividend payments at the rate of $1 United States gold per quarter were begun late in 1916; in March, 1917, the dividend rate was increased to $1.50 per quarter. This latter rate was maintained throughout 1917; $1 of the dividend was considered as regular and $0.50 as extra.

The list of companies in the table above, while not exhaustive, is fairly representative of the various classes of industry in Peru. It should be noted that dividend payments made by local Peruvian companies during 1916 were on the whole more liberal than those during 1915, reflecting the returning prosperity of the country.

URUGUAY.

INTRODUCTION.

The Republic of Uruguay is situated in the southeastern part of South America, between Brazil on the north, Argentina on the west, the River Plate on the south, and the Atlantic Ocean on the east. Its area is 186,926 square kilometers (72,153 square miles). Although the smallest among the South American Republics, it exceeds in size the whole of New England. No less than 668 miles of the country's boundaries lie on the ocean or on rivers. The land is gently rolling, sloping slightly toward the west, south, and east, thus forming the natural watersheds of the River Plate, the Uruguay River, and other streams and lakes. The principal waterways are navigable for the greater part of their courses.

The climate is temperate and pleasant, there being neither extreme cold nor excessive heat, and the country is generally highly suitable for its leading industries—farming and the raising of sheep and cattle. The rainfall is sufficient to provide a fairly abundant water supply and to cause the growth of magnificent grasses for cattle and sheep pasture.

According to the statistics for the year 1913 the population of Uruguay numbered 1,279,359 (at present it is about 1,450,000), about one-fifth of whom were of foreign birth—principally Italians and Spaniards, but with a sprinkling of British, Germans, French, and other nationalities. The Republic has made wise efforts to attract immigration and renders to newcomers whatever assistance is possible. The Government is thoroughly in harmony with the most advanced democratic principles, and citizens and residents are protected by a system of wise laws, assuring equality and thorough protection for the enjoyment of all rights.

Commercially the nation has attained considerable importance. Its exports for 1916 totaled $76,382,043 United States currency and its imports $34,952,294, the total foreign trade being $111,334,337, as compared with $111,951,501 in 1915, $92,701,904 in 1914, and $122,889,888 in 1913. Approximately 96 per cent of the total exports in 1916 consisted of animal products.

The principal port of Uruguay is Montevideo, where excellent docks and harbor works have been provided at a cost, including improvements, of about $40,000,000. The population of the city, according to the census of 1913, was 359,526, it being by far the largest and most important place in the Republic. There are at least 2,867,600 square meters (3,429,650 square yards) of paved streets, and provision has been made for large additional expenditures along this line. There are about 600 streets in all, many wide and very prettily laid out. During the years 1909 to 1913, inclusive, 11,125 building permits were granted, as compared with

4,703 during the five previous years. The city is provided with three street-car lines, two telephone companies, excellent electric lighting, and comprehensive water and drainage systems.

Paysandu, Salto, Mercedes, Fray Bentos, Colonia, Minas, Melo, and San Jose de Mayo are important cities, their population varying from 15,000 to 30,000. There are also a dozen others with between 10,000 and 15,000 inhabitants. Paysandu, Salto, and Fray Bentos may be spoken of as particularly busy cities, all being river ports and outlets for considerable commerce in meats and packing-house products.

GOVERNMENT FINANCES.

EXTERNAL LOANS.

The public debt of Uruguay is largely of an external character, being represented by bonds largely held in Great Britain and on the Continent of Europe. During recent years an increasing amount of the external bonds have been purchased by investors in the Republic, and, since the war, a certain amount of financial aid has been rendered by American bankers. During the period since the outbreak of the war interest has been met on obligations, the amortization of the various external bonds having been postponed. The following statement shows the debt of the nation over a period of years; the amount outstanding is expressed in Uruguayan pesos, 1 peso being equal to $1.034 United States currency:

	Pesos.		Pesos.
1860	2, 726, 880	1913	136, 298, 859
1870	17, 241, 020	1914	141, 144, 137
1880	48, 505, 069	1915	147, 559, 148
1890	89, 848, 851	1916	149, 645, 422
1900	125, 506, 953	1917	158, 874, 915
1910	134, 228, 877		

The history of the external debt of Uruguay virtually commences in the year 1871, when the Government issued through London bankers £3,500,000 6 per cent consolidated bonds at 72 per cent, the proceeds to be used to consolidate internal liabilities. Part of these bonds were exchanged for the £1,000,000 bonds of the Montevideo external loan of 1864 (sold in Europe at 60 per cent). From 1876 to 1878, inclusive, service on the bonds was suspended, but in the latter year £371,520 1¼ per cent bonds were issued in lieu of unpaid coupons and interest on the original bonds was reduced to 2½ per cent for a period of five years.

In 1883, 5 per cent unified bonds were issued to the amount of £10,276,000 in exchange for the £3,467,500 6 per cent external bonds that remained outstanding and £6,808,500 internal bonds. The sinking fund on the issue was ½ per cent per annum, cumulative.

In 1888 £4,255,300 6 per cent bonds were issued abroad through Baring Bros. & Co. at 82½ per cent, the proceeds to be used to take care of floating debt and to provide for important public works. In 1890 an additional £1,980,000 6 per cent loan was contracted abroad.

During the year 1891 the Government, not being able to meet coupons, arranged for the conversion of the outstanding loans, as above, amounting to £16,724,300, with overdue interest to the amount of £625,573, total £17,349,872, into £18,130,905 3½ per cent consolidated bonds. In accordance with the arrangement the 5 per cent unified bonds of 1883 received £105 in new bonds and the 6 per cent bonds of 1888 and 1890 received £115 and £113, respectively, the old bonds being canceled. Commencing with the consolidated three-and-a-halfs the external bond issues of the Republic have been as follows:

Consolidated 3½ per cent loan of 1891.—Interest is payable quarterly, commencing February. For the payment of interest and sinking fund on this issue and for certain railway guaranties, 45 per cent of the gross customhouse receipts have been assigned, and if these are insufficient other revenues will be drawn on. The par values of the bonds are £20, £100, £500, and £1,000. The sinking fund of £205,000 per annum was operated in 1895 and between 1905 and 1914. In November, 1914, owing to the decrease in customs receipts, the sinking-fund operations were suspended, although interest was regularly paid. The operations of the sinking fund are to be resumed one year after the termination of the war. There are outstanding at present £16,367,980 of the bonds, of which approximately 69.73 per cent are held in Europe and 30.27 per cent in Uruguay, as compared with 86.27 per cent in Europe and 13.73 per cent in Uruguay in 1892. Interest is payable in Montevideo and London.

Five per cent bonds of 1896.—Interest is payable quarterly, commencing January, at Montevideo and London. The par values of the bonds are £20, £100, £500, and £1,000. The sinking fund of 1 per cent per annum purchases bonds at below par or draws them at that figure. The bond issue is a first charge on 5½ per cent of the customhouse receipts. The sinking fund was suspended November, 1914, until one year after the termination of the war. Interest is being regularly paid. The bonds were issued to provide funds for the formation of the Banco de la República. The original issue was £1,667,000 bonds and the offering price 71½ per cent. Outstanding bonds amount to £934,400.

Five per cent conversion bonds.—The par value of the bonds is 100 pesos ($103.42 United States currency; £21 5s.). Interest is payable quarterly at Paris, London, and Montevideo. The sinking fund of one-half per cent, cumulative, began in the year 1906. This sinking fund has been suspended from November, 1914, until one year after the termination of the war. Bonds are secured by 24 per cent of the customhouse receipts. The original issue was £6,912,836, mostly sold to the Banque de Paris et des Pays-Bas at 90 per cent and resold by them to the public at 97 per cent. The British portion of the loan was publicly offered at 96¼. The amount outstanding at present is £6,239,648, of which approximately 70.74 per cent is held in Europe and 29.26 per cent in Uruguay.

Five per cent bonds of 1914.—Interest is payable January and July in London and Belgium. The sinking fund of 1 per cent per annum, cumulative, has been suspended until one year after the termination of the war. The loan is secured by certain customs revenues. The proceeds of the issue have been used to pay off floating debt and to increase the capital of the Banco de la República. The original issue (all outstanding) was £1,072,360.

Five per cent public works loan of 1909.—The sinking fund is 1 per cent per annum. The loan was issued in Paris at 97 per cent, the proceeds being used to carry out certain public works. It is not secured by any of the receipts of the customhouse. The original issue was £1,276,672 (30,000,000 francs), and the amount outstanding is £1,203,996. The bonds are not quoted in London.

The quotations of the various issues listed on the London Stock Exchange follow:

Bonds.	High price since 1911.	Price January, 1918.
3½ per cent consolidated bonds	79	75
5 per cent loan of 1896	102	83
5 per cent conversion bonds of 1905	102½	83
5 per cent gold bonds of 1914	90⅛	77

The above issues and the 5 per cent bonds of 1909 are quoted on the Paris Bourse. The 3½ per cent bonds and the 5 per cent bonds of 1905 were quoted at Montevideo May 15, 1917, at 63 and 85.

INTERNAL LOANS.

The internal debt of Uruguay as of December 31, 1916, stood at approximately 26,432,804 pesos. This included 3,801,000 pesos 6½ per cent conversion bonds issued as per law of November 8, 1916. These bonds are quoted on the "Bolsa" (stock exchange) at Montevideo at approximately 96.50. Other important issues included the Debt of Guaranty, 4 per cent for 2,630,200 pesos, which is now held by the Government itself, although still held alive. The internal unified debt, which was originally issued to the amount of 7,900,000 pesos, is outstanding to the amount of approximately 1,448,650 pesos. Although this is an internal loan, approximately 1,000,000 pesos is held in England. The loan of the State Insurance Bank, which bears interest at 5 per cent and which is outstanding to the amount of 3,000,000 pesos, included in the total internal debt, is held by the State. The remainder of the internal debt is largely made up of State Electric Works Department 5 per cent bonds, Treasury warrants, land-grant bonds, mortgage-bank (Banco Hipotecario) certificates, and Uruguayan Eastern Railway guaranty bonds. In addition there are outstanding so-called "international bonds" to the amount of 2,156,550 pesos, the outstanding balance of an issue of the Brazilian Loan of 1894 to the amount of 3,500,000 pesos.

Of the total public debt of Uruguay, briefly discussed in the preceding paragraphs, approximately 10,000,000 pesos bonds are the property of the Government or of institutions controlled by the Government. The real national wealth of Uruguay is estimated at 1,500,000,000 pesos, of which Government properties constitute 100,000,000. Railway guaranties and interest payments amounted in 1913 to 8,607,045 pesos.

MORTGAGE BANK CERTIFICATES.

The Banco Hipotecario, or State Mortgage Bank, has been a national institution since the year 1912. The capitalization December 31, 1916, consisted of 3,703,829 pesos stock of an authorized total of 5,000,000 pesos. "Cedulas" and "titulos" in circulation amount to 36,766,700 pesos. These "cedulas" and "titulos" are similar to those in circulation in Argentina, Chile, and elsewhere and are issued in series, the "cedulas" comprising series "A" and "B" and the "titulos" series "C" to "R." The average price for the "titulos" varies between 94 and 96, according to the length of maturities. The "cedulas" and "titulos" (certificates) are secured by real estate valued in excess of 73,000,000 pesos and are favorite investments in Uruguay. A fair amount of them is held abroad, interest being payable in London, Paris, and Amsterdam. The institution cost the Government 5,000,000 pesos and is valued to-day at 12,000,000 pesos. The bank pays annually to the Government as interest (5 per cent) and sinking fund (1 per cent) on bonds the sum of 300,000 pesos.

MUNICIPAL EXTERNAL BONDS.

The city of Montevideo has outstanding an issue of 6 per cent bonds of 1889, the interest on which is payable in June and in December in Great Britain. The cumulative sinking fund has been suspended during the war. From 1892 to 1894 the interest on these bonds was paid at the rate of 4 per cent per annum; from 1895 to 1897 at 4½ per cent, with ½ per cent sinking fund; from 1898 to date, 5 per cent per annum interest, with ½ per cent sinking fund from 1898 to 1914. The original issue was for £1,376,596 bonds (sold at par, 1889), of which £980,718 remain outstanding. Certain taxes are hypothecated for the service of the loan, which is an obligation both of the municipality and of the National Government. The high price since 1911 was 103; the low, 64¾; and the present (January, 1918), approximately 74 per cent. Bonds are obtainable in amounts of £20, £100, £58, £95, £500, and £1,000.

No obligations of Uruguayan municipalities other than Montevideo are known abroad and none are quoted on the stock exchange at Montevideo.

RECENT FINANCIAL CONDITIONS.

Uruguay, in common with other Latin American Republics, has suffered severely through decreases in customs revenues and other income. For the fiscal year ended June 30, 1915, a deficit of 933,031 pesos resulted—an amount considerably below the expected total, however, inasmuch as the estimated deficit, as stated in the budget, was 6,189,823 pesos. The estimated deficit for 1916–17 was stated to amount to 2,792,849 pesos.

BANKS AND BANKING.

Uruguay possesses a banking institution similar to the Bank of the Argentine Nation, entirely under State ownership. This is known as the Bank of the Republic (Banco de la República), and was established in the year 1896. Its original capitalization was 4,850,000 pesos, representing a large part of the proceeds of the £1,667,000 5 per cent external loan of 1896, which was sold in Europe at 71½. It was provided in the original charter that the bank should pay from its profits the 5 per cent interest and 1 per cent amortization on the loan each year, and that the balance should be appropriated, one-half to the Government, and one-half to the bank—to be added to its capital. Its capitalization at the close of the last fiscal year had grown to 13,883,434 pesos.

In 1914 the bank's charter was changed, and provisions were made whereby the entire net profits—less interest and amortization on the loan, and 50,000 pesos per annum to be used toward the construction of the Legislative Palace—were to be contributed to the bank. Profits for the year 1913 amounted to 1,569,954 pesos and payment upon the loan to 470,000 pesos. The profits since the outbreak of the war have not been so large—amounting in 1916 to 1,281,790 pesos. Owing to the suspension of the sinking fund on the loan, only the interest upon the outstanding balance was paid, this amounting to 220,705 pesos. After the payment of this sum and the 50,000 pesos toward the construction of the legislative palace, there remained 1,011,084 pesos surplus, which was added to the capitalization and resources of the bank.

The Bank of the Republic has a monopoly of the issuing of bank notes. Its charter authorizes the issue of bills of 10 pesos and larger denominations, payable at sight in gold, up to three times the amount of its paid-up capital, and smaller bills up to 50 per cent of the same capital.

The condition of the department of issue as of December 31, 1916, was as follows:

	Legal limit.	Amount in circulation.	Balance issuable.
	Pesos.	*Pesos.*	*Pesos.*
Large bills	27,766,880	27,396,120	370,760
Small bills	6,941,721	6,631,664	310,057
Total	34,708,601	34,027,784	680,817

Large bills to the amount of 2,537,700 pesos were also in circulation against gold deposited in the legations.

The bank is required to have on hand at all times an amount of gold equal to not less than 40 per cent of the demand deposits and large bills in circulation. Shortly after the outbreak of the war the limit of the issue of large bills was reduced from 36,000,000 pesos to 26,000,000 pesos, the bank being exempted from its obligation to redeem its bills during a period of six months. Since 1914 the legal limit has been increased to the amount stated in the table above. As against the 27,396,120 pesos of large bills in circulation, the gold reserve of the bank totaled 12,279,190 pesos.

The Bank of the Republic handles a general commercial business, and has, in addition to its Montevideo bank, 25 branches throughout the Republic. The interest rates allowed are 1 per cent on accounts current, 3 per cent on fixed deposits, 4 per cent on six-months deposits, 3 per cent in the savings bank, etc. The institution has proved of immense value to the nation and has had much to do with preserving the stability of Uruguayan currency during the most trying periods of the war. In this respect Uruguay enjoys a most enviable position among the nations of the world.

Mention has already been made on page 348 of the State Mortgage Bank, the 3,703,829 pesos shares of which are owned by the Government. Discussion concerning the operations of the State Insurance Bank (Banco de Seguros del Estado) will be reserved until a later paragraph.

The four important British banks (see Argentina, p. 43) operate branches in Uruguay, as do the National City Bank of New York, the German Transatlantic Bank, the Italian-Belgian Bank of Brazil, of São Paulo, and two Argentine banks, the Bank of Galicia and Buenos Aires and the Spanish Bank of the River Plate. The French bank of Supervielle & Co. also maintains a branch at Montevideo.

Three of the most important local banks are the Italian bank (Banco Italiano del Uruguay), the Commercial Bank (Banco Comercial), and the Credit Bank (Banco de Crédito). The Italian bank, located at Montevideo, was incorporated in 1887. Its authorized capitalization is 5,000,000 pesos, of which 4,000,000 pesos has been issued and is outstanding. Reserve funds amount to 979,375 pesos and provisional fund to 150,000 pesos. Branches are maintained at Paysandu and Mercedes. The bank allows 1 per cent on accounts current and deposits up to 30 days, 4 per cent on 60-days to three-months deposits, 5 per cent on six-months deposits, and 5½ per cent on yearly deposits. The shares of the bank are listed on the Montevideo Bolsa (Stock Exchange), and a recent quotation (April, 1917) was 135.

The Commercial Bank was established in the year 1857, its principal founders being two Englishmen, Messrs. Jackson and O'Neill. Its growth has been steady and to-day it is an institution of considerable importance. The authorized capital of the bank is 4,000,000 pesos, of which 2,000,000 pesos are outstanding. Reserve funds total 810,000 pesos. Interest rates allowed by the bank are: None for accounts current, 3½ per cent for three months, 4 per cent for six months, and 4 per cent for one year. The rates allowed by the savings bank are 4 and 5 per cent per annum on three and six months' accounts covering deposits of from 1 peso to 5,000 pesos. Recent quotations (April, 1917) of 155 and 156 were recorded for the bank's shares, these being listed on the Montevideo Stock Exchange. The bank's profits for 1915, a year of depression, were 117,737 pesos and the dividend 8½ per cent.

The Credit Bank was founded in 1908. Its authorized capitalization is 3,000,000 pesos, of which 1,500,000 pesos are outstanding. Reserve funds total 178,000 pesos. Shares are quoted at 110. The bank makes more liberal interest allowances than most of the other institutions, allowing 1 per cent on sight deposits, 2 per cent on 30-days' deposits, 5 per cent on three months, 6 per cent on six months, 6½ per cent on one year, and 7 per cent on two years. Five per cent and 6 per cent are the rates allowed by the savings bank.

INSURANCE.

The Government of Uruguay established in the year 1911 the State Insurance Bank (Banco de Seguros del Estado), which in accordance with the law is privileged to enjoy a monopoly of the insurance business. Despite its privilege, however, the State has not made use of its right to prohibit the operations of private companies. The bank is capitalized at 3,000,000 pesos and handles at the present time about 37 per cent of the fire insurance business of the Republic. It covers a variety of fields, among them fire, life, automobile, liability, marine and river, industrial, animal, rail, plate glass, etc. Fire insurance premiums paid to the bank in 1916 amounted to 319,439 pesos; automobile insurance, to 26,510 pesos; accidents to workers, 166,561 pesos; hail, 35,592 pesos; life, 694,396 pesos; marine and river, 156,466 pesos; and plate glass, 9,315 pesos. The profits of the bank during a recent fiscal year amounted to 482,889 pesos, of which 282,633 pesos was credited to reserve fund and 200,256 represented profits.

No new fire insurance companies have been allowed to enter the country since 1911, there being to-day 19 private companies in the field; 14 of these are British or British Colonial, 1 German, 1 Italian, 1 French, and 2 (the Previsora Uruguaya and L'Unión) local. In accordance with the schedule promulgated in 1916, each company operating in this field is required to make a deposit of 30,000 pesos and to pay a license tax. Any foreign company entering the field upon investing 150,000 pesos in either real estate or in public bonds deposited in the Bank of the Republic is considered nationalized and allowed to do business under conditions similar to native companies. Total premiums paid to all fire insurance companies in Uruguay, including the State Insurance Bank, amounted in 1915 to 682,884 pesos, as compared with 706,430 pesos in 1914.

RAILWAY DEVELOPMENT.

The development of the network of railways that traverses the Republic of Uruguay has been carried on almost wholly by the investment of British capital. The first mileage was built shortly after the granting of a concession in the year 1865 for a line from Montevideo to Rio Negro. Construction work was carried on slowly at first and at the close of the year 1879 only 359 kilometers (223 miles) of line were in operation. During the two following decades progress was more rapid, 1,670 kilometers (1,038 miles) of railway being worked at the close of 1899. In 1912 2,516 kilometers (1,563 miles) were in operation, in 1914 2,578 kilometers (1,602 miles), and in 1917 approximately 2,650 kilometers (1,647 miles)—all of 4-foot 8½-inch (standard) gauge.

Although there is only one tunnel in the entire Republic, construction has generally been fairly costly. Curves, owing to the undulating nature of the country, are quite numerous, and there are upward of 300 bridges varying in length from 30 to 2,500 feet, the most important bridge spanning the Rio Negro. In proportion to the area of the country, Uruguay stands first in South America and second in Latin America in railway development, Cuba occupying first place. During the fiscal year 1912–13, the banner year for railways in Uruguay, 1,838,213 passengers were carried, the total passenger miles traversed being 111,533,942. The freight tonnage amounted to 1,742,425. The paid-up capital of the various railways exceeds 74,000,000 pesos, and the guaranteed capital amounts to more than 40,000,000 pesos.

The starting point for the railway system is naturally Montevideo, which is the terminus of the Central Uruguay Railway, the most important line in the Republic. All the other railways of the Republic act as feeders to this line. The following table shows the important railway lines, the mileage operated June 30, 1917, and the earnings for 1916–17:

Railway lines	Miles operated.	Gross receipts for 1916–17.	Railway lines.	Miles operated.	Gross receipts for 1916–17.
Central Uruguay Railway:			Northwestern of Uruguay		
Original line	271	£688,503	Railway	113	[a]295,778
Northern Extension	185	132,159	Uruguay Northern Railway	73	£21,404
Eastern Extension	311	262,035	Uruguay East Coast Railway	78	....
Western Extension	211	94,101	Durazno to Trinidad line		
Midland Uruguay Railway	319	155,114	(State Railway)	....	....

[a] Pesos.

CENTRAL URUGUAY RAILWAY AND EXTENSIONS.

As indicated in the table above, the Central Uruguay Railway system is operated in four sections—the Central Uruguay Railway Original Line (including the Northeastern Line), 271 miles; the Northern Extension Railway, 185 miles; the Eastern Extension Railway, 311 miles; the Western Extension Railway, 211 miles; total mileage, 978. The Main, or Original, Line traverses the central portion of the country from Montevideo, where a terminal costing more than £140,000 is owned, to the Rio Negro—273 kilometers (170 miles). The first 100 kilometers (62 miles) of country contains some of the best garden and agricultural lands in the Republic. En route to the Rio Negro the line passes through the most populous sections of the country, including several cities, such as Santa Lucia, Florida, etc., with populations varying from 8,000 to 12,000. Since August 25 a 33-kilometer (21-mile) line to San Jose connects with the Western Extension Railway (see subsequent paragraph). San Jose has a population of about 15,000, and is a town of importance. The Northeastern Line, the earnings of which are included in the statement of the Original Line, extends from Toledo, 25 kilometers (16 miles) from Montevideo, to Minas, 125 kilometers (78 miles) from Toledo. Pando, an important city, is passed through. The gross receipts of the Original Line and Northeastern Line for the year ended June 30, 1918, totaled £970,879, as compared with £688,503 in 1916–17, £653,442 in 1915–16, and £738,143 in 1912–13.

The capitalization of the Central Uruguay Railway as of June 30, 1917, not including securities of the various extensions outstanding in the hands of the public, was as follows:

Securities.	Amount outstanding.	High price since 1911.	Approximate price January, 1918.
Ordinary stock	£2,000,000	115	53
Preference stock, noncumulative 5½ per cent	800,000	[a]12	[a]7½
Permanent 6 per cent debenture stock	1,200,000	131	105
4 per cent Western Extension debentures	1,000,000	93	72
5 per cent debenture stock	1,292,470	91½	78
6 per cent second debenture stock	250,000	106	91
Total	6,542,470		

[a] Par £10; par value of other issues £100.

The total capitalization of the Central Uruguay Railway and extension railways outstanding in the hands of the public is approximately £10,036,666.

The ordinary stock received 1 per cent in 1916, nothing in 1915, 2½ per cent in 1914, 6½ per cent in 1913, 7 per cent in 1912, 5½ per cent in 1911, etc. Despite the fact that maintenance expenses will have to be increased in the not distant future, the stock may be said to offer fair possibilities as a semispeculative investment. The preference stock likewise is fairly attractive owing to the fact that it yields more than 7 per cent. The bonds also are selling well below normal. A general advance in freight and passenger rates is looked for in the near future, petitions having been put before the Government to that effect.

Before discussing briefly the various extension railways, it should be stated that the total gross receipts for all of the lines comprising the system in 1917–18 totaled £1,514,438, as compared with £1,198,318 in 1916–17, £1,086,868 in 1915–16, and £1,243,393 during the pre-war year 1912–13. The railway, despite the important part it has played in the development of the Republic, has experienced a long period of depression, and shareholders have not been reaping the hoped-for returns on their capital outlay. The property is an excellent one and should recover rapidly following the return of prosperity.

The Northern Extension of the Central Uruguay Railway is a continuation of the main line northward from the Rio Negro to the Brazilian frontier at Rivera, thence across the boundary to Sant' Anna do Livramento—a total of 185 miles. The beef factories of the latter place furnish a considerable amount of traffic to the "Central's" line. The Rivera-Sant' Anna do Livramento line is laid with three rails to accommodate also the Brazilian line. A triweekly passenger-train service is in operation between Montevideo and Rivera, connecting with southern Brazilian points such as Santa Maria, Rio Grande do Sul, and Porto Alegre. The Saturday train from Montevideo affords direct connections with the weekly through train to São Paulo, and it is expected that a fair amount of traffic will develop between the River Plate cities and São Paulo and Rio de Janeiro. The time between Montevideo and São Paulo is 108½ hours and the distance more than 1,800 miles. Through dining and sleeping car service is maintained.

The Northern Extension is worked by the "Central" on a percentage basis, between 40 and 55 per cent of the gross receipts accruing to the latter line. The capitalization consists of £1,000,000 stock and £627,150 5 per cent permanent debenture stock. The stock, which has a par value of £10, received in dividends in 1909–10, 7s. 3d.; in 1910–11, 8s. 6d.; in 1911–12 and 1912–13, 9s. 6d.; 1913–14 to 1915–16, 8s. (4 per cent). The high price for the stock since 1911 was £9⅝ and the January, 1918, price about £6¼. The debentures are quoted (January, 1918) at approximately 79, as compared with the high price of 111 during the past five years. Gross receipts of the extension for 1917–18 amounted to £179,673, as compared with £132,159 in 1916–17, £113,163 in 1915–16, and £147,143 in 1912–13. Net profits for 1917–18 had not been published at the time this report was written. It is certain, however, that they exceeded by a very considerable margin the 1915–16 total of £55,576 and the 1914–15 total of £42,845. In 1913–14 the net profits totaled £59,390 and in 1912–13, £75,531. Pastoral products form practically all of the freight traffic.

The Central Uruguay Eastern Extension Railway is worked on practically the same basis as the Northern Extension Railway (40 to 55 per cent of gross receipts). The line starts from Toledo, on the "Central's" main line, about 16 miles from Montevideo, and extends to San Ramon, Nico Perez, and Melo. There is a branch from Nico Perez to Treinta y Tres, and the total mileage is 311. Triweekly trains run in each direction between Montevideo and Melo and Treinta y Tres, and daily, except Sunday, between Montevideo and Nico Perez.

Most of the country served by this extension of the system is well watered and suitable for agriculture as well as stock raising. There are also considerable areas of forest lands. The population of Melo is nearly 15,000. Gross receipts for 1917–18 amounted to £269,785, as compared with £262,785 in 1916–17, £216,818 in 1915–16, and £251,712 in 1912–13. Net profits for 1915–16 totaled £105,902; for 1914–15, £92,865; for 1913–14, £118,710; and for 1912–13, £129,239. Dividends have amounted to the following (par value of the £860,000 ordinary stock outstanding, £10): 1910–11, 10s. 6d.; 1911–12, 11s. 6d.; 1912–13, 9s. 6d.; 1913–14, 7s. 6d.; 1914–15, 5s. 3d.; 1915–16, 5s. 9d. In addition to the ordinary shares, the company has outstanding £860,000 5 per cent noncumulative preference shares and £1,146,666 permanent 5 per cent debenture stock. The high prices since 1911 and the present prices of the shares and debenture stock are here indicated:

Securities.	High price since 1911.	Price January, 1918.
Ordinary stock	9¾	6¼
Preference stock (5 per cent)	10⅛	7¼
Permanent 5 per cent debentures	111	80

The Central Uruguay Western Extension Railway connects with a branch of the main system at San Jose and extends from there to Mal Abrigo and Mercedes, with branches from Mal Abrigo to Rosario and Puerto del Sauce and from Rosario to Colonia, the total mileage operated by the extension being 211. Unlike the results on other sections of the system, gross receipts for the year 1917–18 were less than for the previous years, amounting to £94,101, as compared with £103,445 in 1914–15 and £106,394 in 1912–13. Net profits for 1912–13 were £37,328, and in more recent years somewhat less. As indicated, the earnings of this section, whose territory is somewhat thinly settled, average considerably less than those of the other sections. A considerable sum is due the parent company for advances. Daily passenger service is maintained between San Jose and Mal Abrigo and triweekly service beyond that point. Mercedes, the terminus of the main division, is a center of the jerked-beef industry and has about 10,000 inhabitants.

During the pre-war year 1912–13 there were handled over the Central system 1,657,986 passengers. Approximately 50 passenger trains are handled at the terminal daily, this including several trains carrying sleeping and dining cars. There were also 1,346,396 head of live stock handled, together with a fair quantity of wool, wheat, maize, sand, limestone, other stones, and firewood. Business prospects for the system, except possibly the Western Extension, seem very much brighter, and results for the 12 months of 1917–18 have exceeded those of the year 1912–13. The following table shows the gross receipts for 1917–18 and the increase or decrease as compared with 1916–17:

Lines.	Fiscal year 1917–18.	Increase or decrease.
Central Railway proper with Northeastern Line	£970,879	+£282,376
Northern Extension	179,673	+ 47,514
Eastern Extension	269,785	+ 7,000
Western Extension	94,101	− 20,770
Total	1,514,438	+ 316,120

The passenger fare from Montevideo to Rivera is 14.10 pesos (May 31, 1917).

In May, 1918, the Government opened negotiations for the acquisition of the entire Central of Uruguay system.

MIDLAND URUGUAY RAILWAY.

Second in importance among the railways of Uruguay is the Midland Uruguay Railway, operating 319 miles, extending from Paso de Toros, a station 2 kilometers (1¼ miles) from Rio Negro station on the Central Uruguay Railway, and running northward and westward. The main line passes through Tres Arboles, Algorta, and Paysandu, terminating at Salto (196 miles). There is direct passenger-train service weekly in each direction and mixed-train service twice a week. Branch lines extend from Algorta to Fray Bentos (87 miles) and from Tres Arboles to Piedra Sola (36 miles). Fares from Rio Negro (Montevideo to Rio Negro, 8.20 pesos) to Paysandu, Salto, and Fray Bentos amount to 5.30 pesos, 8 pesos, and 9.10 pesos, respectively. The three last-named cities are of considerable commercial importance and furnish a fair amount of freight and passenger traffic. Despite this fact, earnings of the line have never come up to expectation and payments on securities are made largely through the medium of Government guaranties. In 1917–18 the gross earnings amounted to £156,243, as compared with £155,345 in 1916–17, £112,727 in 1915–16, £113,109 in 1914–15, and £136,422 in 1912–13. Net receipts for 1916–17 probably totaled approximately £50,000, as compared with £38,989 in 1912–13 and smaller amounts in 1913–14 and 1914–15. The line carries a guaranty from the Government of 3½ per cent on £5,000 per kilometer, repayable after profits of 6 per cent on £5,000 per kilometer have been earned. This subsidy will expire in 1928 and 1930.

The existing capitalization of the Midland Uruguay, together with quotations for the securities, is shown in the following table:

Securities.	Amount.	High price since 1911.	Price January, 1918.
Ordinary stock	£600,000	41	12
5 per cent redeemable prior lien debenture stock	a 570,741	104	84
5 per cent debenture stock, redeemable	a 1,189,443	93	56
	2,360,184		
5 per cent Midland Uruguay Extension debenture stock	200,000	93¾	64
Total	2,560,184		

[a] The operations of the sinking fund have slightly decreased these amounts.

The entire issue of £100,000 ordinary shares of the Midland Uruguay Extension Railway is owned. This extension represents the line between Tres Arboles and Piedra Sola. Its returns are included in the income account of the Midland Uruguay Railway. No dividends have been paid on the ordinary shares of the Midland Uruguay Railway since December, 1896.

NORTHWESTERN OF URUGUAY RAILWAY.

The Northwestern of Uruguay system consists of 113 miles of standard-gauge railway, extending from Salto, the terminus of the Midland Uruguay Railway, in a general northerly direction to Palomas, Cabellos (where connections are afforded with the Uruguay Northern Railway), and Cuareim (opposite Quarahim, Brazil). Salto is opposite Concordia, Argentina, an important railway center located on the Entre Rios and Argentine North Eastern Railway lines, and some traffic is interchanged. At Cuareim an international bridge has been constructed and a third rail laid to afford connections with the Brazil Great Southern Railway, which runs from Quarahim, Brazil, northward.

The railway's gross receipts for 1917–18 totaled 302,303 pesos, as compared with 296,553 pesos in 1916–17, 268,870 pesos in 1915–16, and 233,282 pesos in 1914–15. The Government guarantees 3½ per cent on £5,000 per kilometer on 50 miles of the line, this guaranty being repayable out of surplus profits and expiring in 1925. The capitalization and prices of securities of the company are shown in the following table:

Securities.	Amount.	High price since 1911.	Price January, 1918.
Ordinary shares	£120,120	33	7
6 per cent noncumulative preference shares (first)	583,850	73	23
5 per cent noncumulative preference shares (second)	293,173	41	8½
6 per cent first debenture stock	400,000	111	78
6 per cent second debenture stock (redeemable)	72,625	102	74
	1,469,768		

No dividends have ever been paid on the second preference or ordinary stocks; 1 per cent was paid on the first preference stock in 1905–6, 2 per cent 1906–7 to 1908–9, 2½ per cent in 1909–10, 3 per cent each in 1910–11 and 1911–12, 2½ per cent in 1912–13, and none since.

The country served by this railway is mostly pastoral, although there are agricultural areas and timber and mineral lands. The railway serves as a means of routing traffic around a series of rapids that obstruct navigation in the Uruguay River between Salto and Monte Caseros. Sheep are handled in fair numbers, destined to the refrigeration plants at Montevideo and elsewhere, and live cattle are shipped to Fray Bentos (Liebig plant, etc.).

The Quarahim International Bridge Co., which was formed to erect an international bridge across the Quarahim River, the boundary between Uruguay and Brazil, is capitalized at £10,000 shares and £100,000 (£125,000 authorized) 5 per cent guaranteed first debenture stock. The shares are owned and the bonds guaranteed jointly by the Northwestern of Uruguay Railway and the Brazil Great Southern Railway. The debenture stock is secured on the property and will be redeemed through the operations of a sinking fund of one-half per cent commencing operations in 1920.

The Northwestern of Uruguay Railway operates triweekly passenger-train service in both directions between Salta and Quarahim. Connections are afforded at the latter point with trains for Uruguayana, Itaquy, and other points in southern Brazil.

URUGUAY NORTHERN RAILWAY.

The Uruguay Northern Railway is a 73-mile line, extending from Isla de Cabellos on the Northwestern of Uruguay Railway (where connections are afforded with Quarahim, Salto, Paysandu, Rio Negro, and Montevideo) to San Eugenio on the boundary with Brazil. The earnings of the railway are not large, the total for 1917–18 amounting to £21,545, as compared with £21,423 in 1916–17, £21,217 in 1915–16, £18,748 in 1914–15, £23,636 in 1913–14, £30,196 in 1912–13, and £27,986 in 1911–12. Net earnings have been from £5,000 to £11,000 per annum. The capitalization of the company consists of the following:

Securities.	Capitalization.	High price since January, 1911.	Price January, 1918.
Ordinary shares	£100,000	(a)	(a)
Preference shares, 7 per cent cumulative	250,000	49	14
Perpetual debenture stock [b]	449,400	78	41
5 per cent prior lien debenture stock	49,002	(a)	(a)

[a] Not quoted.

[b] Entitled to 3½ per cent fixed and two-thirds of the net profit up to 1½ per cent on £5,000 per kilometer; interest rate during 1916 was 79s. 9d.; highest rate paid during recent years was 95s. 4d., which was paid in 1913.

The Government guarantees 3½ per cent on £570,776 capital, or £19,977 per annum. The 1916–17 freight traffic was composed chiefly of animal products (mostly live stock). Passenger traffic was limited to three trains per week in each direction. The country traversed is quite thinly settled, although capable of considerable development. The 1916 dividend was at the rate of 2 per cent, as compared with 1¾ per cent the previous year. No dividends were paid during 1913–14, and 1½ to 2 per cent per annum from 1910 to

1912–13. Preferred dividends in arrears at the end of 1916 amounted to approximately £375,000.

URUGUAY EAST COAST RAILWAY.

The Uruguay East Coast Railway operates about 78 miles of road, starting from Olmas, a station on the Central Uruguay (Northeastern) Railway, and running to Maldonado, in the State of Maldonado. A large part of the traffic of the road is due to the fact that the railway serves the seaside resorts of Puenta del Este and Piriapolis, the summering places for numerous residents of Montevideo and Buenos Aires. The freight traffic is divided between agricultural and pastoral products and fish destined for the Montevideo markets. An extension of the line northward to Rocha is projected.

Early in 1918 the Government of Uruguay purchased this railway, giving in exchange for the property 5 per cent Government bonds to the amount of 2,843,500 pesos, with an annual sinking fund of 1 per cent, cumulative.

The capitalization of the company June 30, 1917, was as follows:

Securities.	Amount.	High price since 1911.	Price January, 1918.
Ordinary stock (par £1)	[a] £125,000	$\frac{9}{16}$	$\frac{3}{16}$
5 per cent first mortgage gold bonds	[a] 309,000	91	68
4 per cent cumulative debenture stock	[a] 185,000	66	30
Total	[a] 619,000		

[a] Approximate.

No dividends were being paid on the ordinary stock. The 4 per cent debenture stock received 4 per cent in 1917, 3 per cent in 1916, and 4 per cent per annum during the several years previous. The railway's best year was 1912–13, when the earnings amounted to 193,234 pesos gross and 39,404 pesos net. Securities of the company were not widely distributed.

DURAZNO-TRINIDAD LINE (STATE RAILWAY).

The State railway line from Durazno to Trinidad was taken over from private owners as an unfinished project some time ago. The plan for future construction is a rather elaborate one, which is likely to be deferred until after the close of the war. The Farquhar-Pearson scheme to build a line diagonally across the Republic from the port of Colonia, where docks and terminals were to have been constructed, to San Luis, on the Brazilian border, has fallen through, so far as the promoters are concerned.

RECORD OF OPERATIONS AND OUTLOOK FOR FUTURE.

During the fiscal year ended June 30, 1916, passenger traffic handled by the various Uruguayan railways increased more than 19 per cent and freight earnings about 16½ per cent. Despite this fact and despite the Government guaranties on various lines, dividend payments were mostly quite small. A glance over the record of railway operations covering a period of a dozen years fails to show any startling results. The European war has put a stop to immigration and otherwise disturbed the economic condition of the Republic, and this has been detrimental to the development of the railways. The returns from the live-stock and meat traffic added to the revenues of the various lines during 1916–17. This traffic will continue to be extremely heavy as long as the war lasts. Although better things are expected after the war, the immediate outlook for railways in general throughout the Republic does not indicate that any extraordinary results will be realized. Nevertheless Uruguay railway shares and debentures are selling at extremely low figures, and there are prospects that they will some day bring far better prices. Uruguay needs additional railways through some of the less developed sections of the country. Whether these lines would pay immediately after completion is somewhat a matter of conjecture, yet their construction would be of inestimable value to the nation, and capital invested in them would probably result to better advantage than if placed in the building of lines competing with railways already in the field.

The Government has met its railway guaranties during the most trying period of the recent financial depression.

Several of the Uruguayan railway companies have recently petitioned the Uruguayan Government for increases in tariff rates varying from 10 to 25 per cent per annum. The Government in the case of the Central Uruguay Railway allowed the company to make a surcharge on a large variety of articles of freight, also to raise the price of sleeping berths 1 peso. The Government reserves the right, however, to withdraw the surcharging privilege upon giving three months' notice on any date after October 1, 1917.

In May, 1917, international through train service was established between Montevideo and São Paulo, Brazil. The Saturday evening through train via the Central Uruguay Railway connects at Sant' Anna do Livramento the following afternoon with the through train for Santa Maria, Brazil. From the latter point direct service is maintained to São Paulo. Sleeping and dining car service is provided.

PROJECT FOR SYSTEM OF GOVERNMENT RAILWAYS.

The Uruguayan Government voted recently to employ 10,000 pesos on preliminary surveys for a system of State railways, with the idea of carrying on active construction work as soon as possible.

It was announced in June, 1917, that the Government would contract with the Uruguay Railway for the purchase of the 23 miles of line built between Rocha and Paloma Port, together with equipment, buildings, workshops, etc., as well as rails, ties, and materials of various descriptions that had been delivered to the company prior to its receivership, to be used for the construction of about 31 miles of line from Rocha to San Carlos. Additional equipment sufficient for about 40 miles of line, to be completed at a future date, was also acquired. The price agreed upon by the two parties was 1,000,000 pesos, payable in 5 per cent Government bonds. This acquired mileage, it is said, is to be used by the Government as a nucleus of an

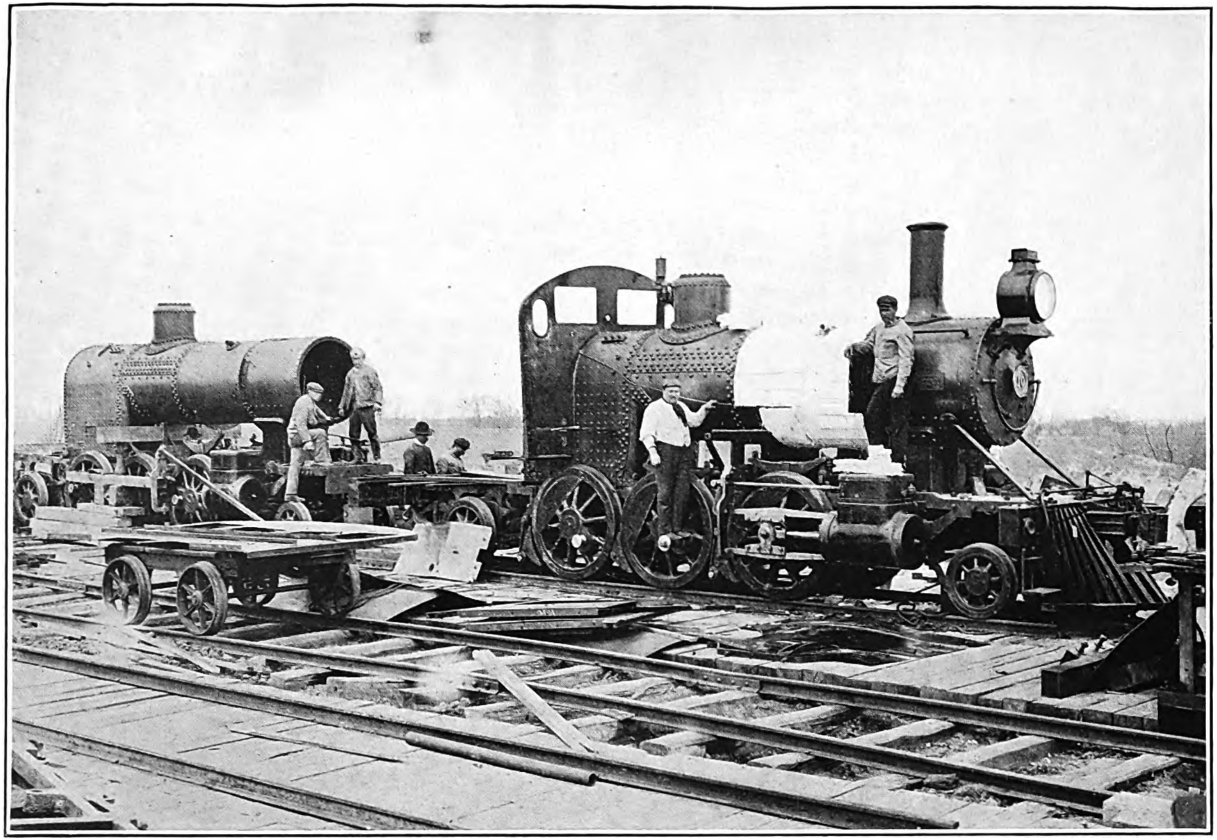

FIG. 22.—AMERICAN LOCOMOTIVES BEING ERECTED AT DURAZNO, URUGUAY.

extensive State-owned railway system. It is stated that the Uruguayan Congress is expected to provide for the immediate construction of the Rocha-San Carlos line.

PUBLIC UTILITIES.

Public-utility development in Uruguay has largely centered in the city of Montevideo, although most of the larger cities and towns throughout the Republic are provided with electric lighting and power systems and with water supply. The electric exploitation has been monopolized by the Government, which operates the lighting system in the capital. In that city there are more than 22,000 subscribers, using upward of 300,000 lights. Profits from lighting in 1912 amounted to 725,500 pesos and in 1913 to 934,795 pesos, from which latter sum sinking-fund payments were made that reduced final profits to 851,453 pesos.

A modern water and sewerage system is being installed for the Government in the city of Mercedes, on the Rio Negro, the principal city in the Province of Mercedes. Similar undertakings are being carried out in the cities of Paysandu and Salto, on the Uruguay River. The contracts for these three enterprises have been undertaken by an American firm of contractors, this concern superseding a French firm whose contract had to be canceled as a result of the war. The cost of these public works totals $5,000,000. The work is expected to be completed by the end of 1918. It is stated that the contractors have petitioned the Government for a concession for the working of the drainage systems in the above-mentioned cities for the period of 15 years.

A waterworks system is also being established in the town of Juan L. Lacaze.

MONTEVIDEO WATERWORKS CO.

The water system in the city of Montevideo is operated by a British company, the Montevideo Waterworks Co. (Ltd.), registered in 1878 and long successful. The approximate rate charged by this company is 20 cents per kiloliter (264 gallons) for ordinary consumption and from 12 cents to 18 cents for manufacturing and industrial establishments. The water system dates from 1871, and the supply is taken from the Santa Lucia River. The company serves nearly 35,000 houses, the daily consumption averaging 120 quarts per capita. During the year 1913 the daily consumption of water averaged 4,093,858 gallons. To take care of this service the company has six settling reservoirs with a total capacity of about 27,000,000 gallons; nine sand filters of 1,200 square meters each, through which 10,300,000 gallons of water can pass every 24 hours; two reservoirs for filtered water with a capacity of 4,740,000 gallons; and five distributing reservoirs with a total capacity of approximately 16,000,000 gallons. The total extent of water mains is about 340 miles. Work was begun three or four years ago on two mechanical filters that will be able to purify 2,400,000 gallons in 24 hours and two distributing reservoirs with a capacity of 5,285,000 gallons.

The company receives a subvention of £1,275 from the Government each year. Its capitalization is as follows:

Securities.	Amount outstanding.	High price since 1911.	Price January, 1918.
Ordinary stock (par £20)	£850,000	£33	£23
5 per cent first debenture stock (par £100)	200,000	110	83
5 per cent second debenture stock (par £100)	150,000	107	81
5 per cent consolidated debenture stock (par £100)	150,000	98½	80
Total	1,350,000		

Dividend payments on the stock have for a number of years been at the rate of 8 per cent per annum. This stock was issued at the following times and in the amounts stated: Original capital, £400,000; issued in 1905, £100,000; 1907, £250,000; 1911, £100,000; total, £850,000. The 5 per cent first debenture stock was issued in 1883 and is a floating charge on the property and undertaking; interest is payable June 30 and December 31. These debentures are irredeemable. The 5 per cent second debenture stock is also irredeemable. It was issued in 1889 and is subject to the first debenture stock; interest June 30 and December 31. The 5 per cent consolidated debenture stock was issued to provide funds for the filtering and distributing reservoirs previously described. They are subject in lien to the first and second debenture stock, but are redeemable at 105 per cent at any time after June 30, 1919. Interest is payable in January and July.

MONTEVIDEO GAS CO.

The gas supply of the city of Montevideo is furnished by the Montevideo Gas Co., a British corporation. The company was founded in 1872, and its original concession expired in 1887. In 1889 its by-laws were changed so as to enable it to engage in other lines of business. In addition to its gas privileges, the Maua dry dock is owned and a general engineering and ship-repairing business is handled. Previous to the nationalizing of the electric-lighting system the gas company furnished the city with a part of its public lighting.

The capitalization of the Montevideo Gas Co. consists of £541,920 shares, of a par value of £20, and £28,680 5 per cent first-charge perpetual debenture stock. The shares are quoted (January, 1918) at approximately £8, as compared with £13 10s., the high price since January, 1911. The debenture stock is privately held and not quoted. The report of the company for the calendar year 1916 indicated a net profit of £26,672, and after the payment of interest on the debenture stock and other charges and the inclusion of £13,261 brought forward from 1915, the profit remaining was £30,951. A dividend of 3 per cent for the year was paid on the stock and £14,964 carried forward. Reserve, contingencies, and insurance funds stood as of December 31, 1916, at £32,000, £17,739, and £12,500, respectively. The dividend for 1916 was 3 per cent, as compared with 3 per cent in 1915, 3 per cent in 1914, 4 per cent per annum in 1913 and 1912, and 3½ per cent in 1911, 1910, and 1909.

STREET RAILWAY COMPANIES IN MONTEVIDEO.

Montevideo is served by an extensive street railway system operated by two companies, the United Electric Tramways of Montevideo and the Compañía Transatlántica de Tranvías Eléctricos, the former British and the latter a German company controlled by the Compañía Alemana Transatlántica de Electricidad of Buenos Aires. In the five years 1904 to 1908, inclusive, the street railways of Montevideo carried, on an average, 33,516,690 passengers each year; between 1909 and 1913 the average was 71,458,542 passengers.

The United Electric Tramways of Montevideo owns all of the securities of the Sociedad Comercial de Montevideo, which owns and operates approximately 90 miles of electric railway, its concession expiring in 1978, on which date the municipality may take over the property provided it pays a fair valuation for the power houses, machinery, stations, workshops, etc., or may extend the franchise for 15 years additional, at the end of which period it may acquire the entire undertaking without cost.

The capitalization of the United company consists of £500,000 ordinary and £500,000 cumulative 6 per cent preference shares, the par value of both issues being £5. There is also outstanding approximately £970,000 5 per cent first debenture stock, part of an issue of £1,000,000, the remainder of which has been retired through the operation of the sinking fund. This sinking fund will retire the entire issue by 1978. Quotations on these securities have been as follows:

Securities.	High price since. 1911.	Price January, 1918.
Ordinary stock (par £5)	6½	2½
6 per cent cumulative preference stock (par £5)	5$\frac{9}{16}$	3
5 per cent debenture stock (par £100)	106	76

The regular dividend of 6 per cent per annum on the preference stock has been maintained for years. Dividends on the ordinary stock in recent years have been at the following rates: 1909, 6 per cent; 1910 to 1913–14, inclusive, 7 per cent per annum; 1914–15, 4 per cent; none since. The gross traffic receipts for the year 1916–17 (year ended Mar. 31) amounted to £330,601, an increase of £17,172, as compared with the year previous. Operating expenses consumed 68.69 per cent of the gross as compared with 63.64 per cent the year previous and 60.86 per cent in 1914–15. Net receipts for 1916–17 totaled £108,898, as compared with £120,220 in 1915–16 and £141,477 in 1914–15. The increase in operating expenses has been due largely to the increased price of coal, the cost to the company in 1917 being approximately 150s. per ton, against 38s. to 52s. per ton the year before. Higher wages and increased freight charges on imported materials also contributed to the decrease in net profits. The company, after making ample appropriations to the various reserves and sinking-fund accounts, carried forward £12,814, as compared with £13,103 brought forward from 1915–16. The company had in service at a recent date 240 cars and 73 trailers. The company's securities are good semispeculative investments.

The Compañía Transatlántica de Tranvías Eléctricos de Montevideo is, as stated, controlled by the Compañía Alemana Transatlántica de Electricidad of Buenos Aires (see Argentina, p. 68). The latter company, which is controlled in Germany, owns the 1,688,500 pesos stock of the Montevideo enterprise. The mileage operated is about 85, and the equipment in service consists of 234 cars and 38 trailers. A number of cars on this and the British line are of American manufacture. Information concerning the earnings of the German company is not available. Its business, although a number of important thoroughfares are traversed, is not as large as that enjoyed by the United company. The entire line is operated by electricity.

In addition to the two electrically operated tramway lines there is a third street railway system—that operated by the Tranvía del Norte (Tramway of the North). About 11 miles of horse-car lines are operated by this company. Passengers carried in the normal year 1913 totaled 3,359,344, and gross receipts amounted to 140,659 pesos. It is expected that when normal prosperity returns this system will be electrified. Its location is good and a large additional amount of traffic would probably be enjoyed.

MONTEVIDEO TELEPHONE CO.

Another important British-owned public utility is the Montevideo Telephone Co., one of the two companies serving the capital city and its suburbs. These two companies have considerably more than 10,000 subscribers. The British company's concession allows it to lay wires anywhere within the limits of the Republic. The capitalization of the company, which has its head office in London, consists of the following securities, both classes of which are listed on the London Stock Exchange:

Securities.	Amount.	High price since 1911.	Price January, 1918.
			s. d.
Ordinary stock (par £1)	£76,280	£1$\frac{1}{16}$	21 3
5 per cent cumulative preference stock (par £1)	83,492	$\frac{7}{8}$	16 0

For the year ended July 31, 1915, the company earned a net profit of £26,737, including £5,303 brought forward from the previous year, and after paying 5 per cent on the preference shares and 6 per cent on the ordinary shares was able to carry forward to 1916 £5,394. The 6 per cent dividend rate on the ordinary stock has been maintained for a number of years. The growth of the company has been consistent, however, the profits for 1915, as shown above, having increased from £13,000 10 years previous. The company has been in existence since 1888.

About two years ago a bill was introduced in the Uruguayan Congress whereby the telephone service would become a Government monopoly, the Government to establish a system of underground cables.

In the interior of Uruguay telephone systems for the police and private individuals and concerns are operated with the temporary permission of the Government.

TELEGRAPH LINES.

The local telegraph system is under national control. The various railways also maintain private lines, and several of the international companies, including the Western Telegraph Co., the River Plate Telegraph Co., etc., maintain cable service. The national lines are 2,664 miles in length and during the year 1913 handled 930,169 telegrams, employing 210 persons and operating 85 offices. The expenses of the Government system amount to 237,336 pesos, and sufficient business is handled to maintain the service without loss.

MINERALS AND MINING DEVELOPMENT.

Persons seldom speak of Uruguay as a mineral country, yet the Republic may be said to contain considerable wealth in gold, silver, copper, lead, coal, marble, gypsum, talc, agate, granite, jaspers, topaz, slate, etc. Very little development work has been carried out, except in gold mines, a number of which have been exploited and worked in a small way, without, however, any great amount of success. The only minerals being exported to-day are stone and sand, 1,234,411 tons of the latter being shipped abroad in 1914 and 864,660 tons in 1916. The value of the exports of stone, sand, and minerals in 1914, 1915, and 1916 was 2,525,573 pesos, 1,006,124 pesos, and 488,497 pesos, respectively. Gold bars to the value of 4,000 pesos and 2,030 pesos were also exported in 1915 and 1916. There are several British companies in the field, among them the Uruguay Consolidated Gold Mines (Ltd.), the Uruguay Goldfields (Ltd.), the Hampton Uruguay (Ltd.)—the latter also owning properties in Western Australia. The Hampton Uruguay (Ltd.) formerly owned 60,000 shares of the stock of the Uruguay Consolidated Gold Mines (mentioned above), but the affairs of the latter company have been wound up and the loss to the Hampton Uruguay Co. written off. In 1914 receivers were appointed for the Hampton Uruguay Co., there being a considerable debit balance to profit and loss.

The principal gold areas of the Republic are found at or near Cunapiru, Department of Rivera, not far from the Brazilian frontier. In the Department of Rivera approximately 400 gold mines have been "denounced." There is gold also in the Departments of Minas, Salto, and Tacuarembo. It is expected that, when fairly developed by companies provided with sufficient capital, the gold-mining industry will in time prove profitable.

Copper is found in good quantities in the Departments of Cerro Largo, Maldonado, Minas, Paysandu, and Salto. As is the case with the gold deposits, no development work has been attempted by interests provided with sufficient capital. Silver has been located in various places, and the same is true of iron. Coal of a fair quality has been located in the Departments of Cerro Largo, Montevideo, and Santa Lucia. The deposit found in Cerro Largo gives promise, but the production stage has not yet been reached. Manganese has been located in the Department of Rivera, and a company has been formed in Great Britain to develop it. Paving stones, sand, and similar products have been exported in fair quantities. Amethysts and other precious and semiprecious stones have been exported in small quantities in the past. Several diamond mines have also been registered.

The Government of Uruguay is doing what it can to aid in the development of the mineral resources of the Republic, having established a department of geology to study, among various subjects, the mineral fields. Furthermore, the Government has granted an exemption from duties on all machinery and materials necessary for the mining industry.

Petroleum has been found in Uruguay, although insufficient development work has been carried on thus far to enable any opinion to be stated as to the future of the industry. The discoveries so far made have been in the neighborhood of the city of Melo, capital of the Department of Cerro Largo. The depth at which this deposit was located is about 1,100 feet.

FOREST PRODUCTS.

As previously stated, about 1,065,557 acres of land were under forests in 1908. Little has been done in the way of wholesale timber cutting; in fact, the Government is endeavoring to increase the acreage of trees rather than to encourage the destruction of them for commercial purposes. Millions of trees of various descriptions have been planted on land not useful for other purposes, with the result that in the not distant future the Republic will doubtless greatly increase its sources of supply. The quantity of timber or other forest products exported by Uruguay may be regarded as negligible.

LIVE STOCK AND MEAT INDUSTRY.

Uruguay, primarily a pastoral country, has assumed a high standing among the nations in the sheep and cattle industries. The live stock industry dates from the year 1603, when 100 cattle and two herds of horses were brought into the country. Owing to the rich pasturage the animals multiplied rapidly and soon became very numerous. During the early days these animals were killed solely for their hides, since meat for export purposes was valueless.

In 1754 the first meat-salting plant was established in the country, its operations being of a very restricted character, however. In 1786 a fairly large establishment for the preparation of jerked beef was founded, and this was the real pioneer of the industry. Within the next quarter of a century several additional meat-salting plants were established in Uruguay and the industry was commencing to be a factor in the development of the trade of the then thinly settled land. In about the year 1860 the importation of Durham bulls and fine stock cattle began and this gradually led to a greatly improved breed of animals throughout the country.

The first sheep in Uruguay were imported from Argentina in 1608. For 150 years the industry languished, and it was not until the close of the eighteenth century that any attention was paid to the improvement of breeds. Since that time the industry has gradually assumed considerable importance, and the number of sheep has increased to about 28,000,000.

The following table will indicate the growth of the live stock industry in Uruguay:

Live stock.	1860	1900	1908	1917
Cattle	3,632,203	6,827,428	8,192,608	7,942,212
Sheep	1,989,929	18,608,717	26,286,296	28,000,000
Horses	518,218	561,408	556,307	....
Mules	8,301	22,992	17,671	....
Hogs	5,831	93,929	180,099	500,000
Goats	5,437	20,426	19,951	....

Uruguay possessed, in 1916, 13 meat-salting plants, 7 factories for preserving meat, and 2 freezing plants. In the year 1913 the freezing plants slaughtered 132,650 cattle and 311,111 sheep.

Among the great concerns engaged in the meat and meat-products trade in Uruguay is the Liebig Extract of Beef Co. (see also Argentina), owning an extensive establishment at Fray Bentos, on the bank of the Uruguay River. This company was incorporated in 1865, and its Uruguayan venture followed the successful trial by George Giebert, a German, of a system for the extraction of beef invented by Prof. Justus von Liebig, of Munich, Germany. The head office of the company has always been in London, and its original capitalization was £500,000 ordinary shares, which was issued as part paid and was not finally paid up until 1895. The present capitalization of the company consists of £600,000 ordinary shares, with a par value of £5; also £1,000,000 preference shares and £400,000 notes. Dividend payments on the ordinary shares are generally at the rate of 20 per cent per annum and upward, the 1916 dividend payment being 25 per cent.

The Compañía Swift de Montevideo and the Frigorífica Uruguaya de Montevideo are also important factors in the meat trade. The Compañía Swift de Montevideo (controlled by Swift & Co., of Chicago) exported to Great Britain and the Continent in 1915 726,214 frozen quarters of beef, 169,551 chilled quarters of beef, 83,750 wethers, and 7,525 lambs; in 1916 it exported 717,020 frozen quarters of beef, 99,174 chilled quarters of beef, 96,027 wethers, and 5,295 lambs. The Frigorífica Uruguaya de Montevideo shipped in 1916, 3,985,634 kilos (8,786,851 pounds) of cattle products to England and 15,832,128 kilos (34,903,828 pounds) to the Continent; also 1,015,633 kilos (2,239,065 pounds) of mutton and 942,279 kilos (2,077,369 pounds) of offals to England and 252,103 kilos (555,792 pounds) of offals to the Continent. At last accounts the shares of this latter company were entirely held by the Compañía Sansinena de Carnes Congeladas, of Buenos Aires. The Compañía Uruguaya-Braziliera Rio Blanco, registered in Montevideo in 1913 and capitalized at 1,500,000 pesos, has its head office in Montevideo, although its properties are largely located in Brazil.

Two important estancias controlled by European capitalists are those operated by the Pranges Estancia Co. and the River Plate Land & Farming Co. Both companies were incorporated in Great Britain, the former in 1867 and the latter in 1863. The Pranges estate consists of 59,322 acres at Nueva Alemania, on which are stocked normally about 15,000 cattle, 20,000 sheep, and a number of horses. The capitalization of the company is £120,000, all in ordinary shares, these shares being quoted on the stock exchange at Liverpool, England. Dividends usually average from 16 to 25 per cent per annum.

The River Plate Land & Farming Co. owns a sheep and cattle estancia at Merinos, on the Midland Uruguay Railway, consisting of 39,653 acres, on which are stocked usually about 15,000 sheep, 8,000 cattle, and 350 horses. The capitalization of the company is £40,000. Dividend payments vary between 14 per cent and 20 per cent per annum, and there is a reserve fund of £15,000. The head office of the company is at Liverpool, England, and the ownership is similar to that of the Pranges Estancia Co. (Ltd.).

Nearly all the exports of Uruguay consist of live stock, meat, hides, and other products of animals. The exports of live stock are not very large, consisting in 1916 of 23,682 cattle, 15,590 sheep, 4,536 horses, and 1,142 other animals. The total exports of animal products during 1916 were valued at $73,367,695 United States currency, as compared with $72,933,747 in 1915 and $56,587,379 in 1914.

According to the live-stock and agricultural census in 1908, there were 43,061 farms and ranches in Uruguay, covering 42,302,021 acres, of which 39,249,780 acres were used for pastoral purposes, 1,986,684 acres were under cultivation, and 1,065,557 acres were covered with forests. A total of 109,449 persons were engaged in the agricultural and live-stock industries. The war in Europe has caused the industry to assume great importance, and despite strikes and labor troubles of various kinds it is bringing considerable prosperity to the inhabitants of the Republic. Record prices are being realized for beef, mutton, hides, and wool, and this has brought about a marked rise in land values.

AGRICULTURE.

As stated in the preceding paragraph, 1,986,684 acres of land were under cultivation according to the agricultural and live-stock census of 1908. This area is probably slightly less than the area under cultivation at the present time, but the increase has not been sufficient to alter the fact that the Republic is primarily a pastoral land. The lack of uniformity in the geological formation of the country is the chief cause for the variations in the soils so noticeable in Uruguay. A great section of the Republic is fertile, being covered throughout the year with long, rich grass, used principally for cattle pasture. There being no deserts or mountains and only small timber areas, the farm lands may be readily cleared for planting at a very small expense. As rainfall is generally abundant and the climate delightful, the country is an almost ideal location for the carrying on of agricultural and pastoral pursuits. The agricultural products are insufficient for the needs of the people; and the Government, being thoroughly alive to the situation, is doing everything in its power to assist the farmers by teaching improved methods, providing seeds on easy terms, and rendering financial aid to those not provided with capital.

The area under various crops in a recent year consisted of 911,435 acres sown to wheat, 692,475 to corn, 128,227 to flax, 97,443 to oats, 14,048 to barley, 5,958 to canary seed, and 452 to rye. The total yield in quintals (one quintal=101.28 pounds) amounted to the following: Wheat, 1,602,277; oats, 25,309; corn, 1,814,229; barley, 35,846; flax, 26,141; canary seed, 12,839; rye, 1,170.

Among other agricultural crops of Uruguay are tobacco (which gives promise of a future), linseed, alfalfa, sugar cane, potatoes, etc. The number of tobacco farms in the country is stated to be 745. The total exports of agricultural products in 1916 were valued at $1,502,109 United States currency, as compared with $778,774 in 1915 and $1,450,125 in 1914.

In addition to the various farms in Uruguay, there were, during the year 1913, 2,266 vineyards, raising a good quality of grapes (much in demand in the home markets), and 112 wine depots.

MANUFACTURING AND INDUSTRIAL ENTERPRISES.

One need hardly say that Uruguay is not an important manufacturing country. Most of the industries of this kind are confined to the meat factories, freezing establishments, and other makers of meat products, of whom mention has previously been made, and to factories handling the products of the farm. Among the industrial concerns in the Republic there may be mentioned 115 flour and macaroni mills and factories, 45 other mills, 1 sugar factory, 350 dairies and creameries, 4 breweries, 3 starch factories, as well as candy, soap, furniture, cement, hardware, shoe, leather-goods, brick, glass, and other factories. Some of these factories have up-to-date machinery, while others are operated in a primitive fashion. Most of the industries are located in Montevideo, the census of 1908 indicating that about 4,600 out of a total of 5,357 establishments were located in the capital city. The general manufacturing industry has suffered since the outbreak of the war, particularly during 1917 and 1918, on account of the high cost of coal, the difficulties of obtaining raw materials, and the shortage of labor.

Probably the two most important of the local breweries are the Cervecería Uruguay and the Cervecería Montevideana. The shares of these companies, as well as of several other industrial concerns, are listed on the Montevideo Stock Exchange, although not generally actively quoted. A company with a capitalization of 600,000 pesos was formed during 1912 to manufacture cement, a product much in demand throughout the Republic during normal years. At the outbreak of the war this concern was producing 150,000 barrels a year, as compared with about one-half that amount imported. The plant covered several acres and employed upward of 200 workers.

VENEZUELA.

INTRODUCTION.

The Republic of Venezuela lies wholly within the Tropics. The area is officially stated to be 394,000 square miles. The total population according to the official census in 1891 was 2,664,241. The present estimated population is 2,850,000. Geographically the country is divided into four sections—(1) the Guiana highlands, covering the territory south and east of the Orinoco River; (2) the great central plains, commonly known as the Llanos; (3) the northeastern chain of the great Andean Cordillera, this section forming the northwestern portion of the Republic and bounding the Llanos on the south and east; (4) the lower country bordering on Lake Maracaibo.

The section comprising the Guiana highlands—a great plateau and mountain region, partly unexplored—contains vast forest areas, in which are found vanilla, rubber, tonka beans, and a vast variety of tropical forest products. This great section of the Republic (area 200,000 square miles) is watered by the upper Orinoco, the Cauri, the Coroni, and other tributaries. The highest point in this geographical division is at Mount Roriama, where the Republic joins Brazil and British Guiana; here the altitude reaches 8,500 feet. The population of this district is composed almost wholly of wild Indian tribes.

The great Llanos of the Orinoco cover about 108,000 square miles. The population, other than the Indian tribes, is extremely sparse, vast areas of what is believed to be very valuable territory remaining practically unexplored. This country is mostly a wide grassy pampa or plain, sometimes stretching as far as the eye can reach without a break in the landscape. There are numerous tiny groups of trees, as well as several forests that cover considerable areas. Great sections of the Llanos are subject to periodical floods in the rainy season and droughts in the dry season. These Llanos contain fairly large numbers of cattle, but are capable of sustaining many millions more.

The northwestern, or Andean, section covers about 42,000 square miles. In this territory are located many high mountain peaks, including Mount La Columna, 16,523 feet, and six other peaks with altitudes exceeding 13,700 feet. There are numerous fertile valleys in this district and a number of the important centers of population.

The fourth section includes the region about Lake Maracaibo, the small tracts of coastal lowlands, and the islands tributary to Venezuela. The area of this geographical district is 28,000 square miles.

Caracas, the capital, has a population, including suburbs, of about 100,000. The city is pleasantly located at an altitude of about 3,000 feet on the north bank of the Guaire River. It is about 8 miles from La Guaira as the crow flies, but about 23 miles by rail, owing to the difficult grades encountered. The city is well laid out and there is an excellent water supply, as well as telephones, electric lights, tramways, and other facilities. The city is the terminus for three steam railways, one to La Guaira, the port, one to Valencia, and the third to inland points.

Valencia lies at an altitude of 1,577 feet, with a population at the census of 1891 of 54,387 and at the present time of possibly 60,000. This city also is provided with telephones, electric lights, and tramways and is the terminus for the Great Railway of Venezuela, running to Caracas, and of the Puerto Cabello & Valencia Railway, running to Puerto Cabello.

Maracaibo, with a population probably in excess of 50,000, is the third city of the Republic. It is probably the hottest city in Venezuela and not the most healthful. There is a well-equipped electric lighting plant in the city, as well as two tramway lines. Foreigners are generally astonished at the busy aspect of the place. It is the center of a very large foreign trade, including the exportation of great quantities of coffee. In addition to this commerce with nations abroad, a considerable business is enjoyed with points along Lake Maracaibo and in the interior.

Barquisimeto, at the head of the Bolivar Railway, has a population of 35,000, and Ciudad Bolivar (Angostura), the principal port on the Orinoco River, has about 22,000. Barcelona, Victoria, San Cristobal, Villa de Cura, Merida, Puerto Cabello, Maturin, and Bocono are also important cities with populations of 13,000 to 20,000. La Guaira, the port for Caracas, has a population of about 10,000.

The United States enjoys the benefit of a very large proportion of the Venezuelan trade, which under normal conditions is rather large. The foreign commerce covering a period of six calendar years has been as follows:

	1911	1912	1913	1914	1915	1916
Imports	$18,394,851	$20,568,940	$18,223,103	$13,987,457	$13,470,237	$20,634,419
Exports	22,676,975	25,260,908	29,483,789	21,518,592	23,404,427	22,707,001
Total	41,071,826	45,829,848	47,706,892	35,506,049	36,874,664	43,341,420

Of the exports for 1916, coffee amounted to $10,552,543 and cacao to $4,254,394. Hides and skins, gold, sugar, balata, copper ore, live stock, frozen meats, asphalt, sole leather, pearls, and rubber comprised the bulk of the other commodities sent abroad. Dyewoods and timber are also shipped in fair amounts during normal years.

GOVERNMENT FINANCES.

So far as the interests of present-day investors are concerned, the financial history of Venezuela began in 1905, in which year the consolidated debt of 1880–81 and the 5 per cent 50,000,000 boliviano German loan of 1896 were exchanged for 3 per cent bonds of an issue known as the Diplomatic Debt of 1905, on the basis of 72½ per cent and 100 per cent, respectively. The interest that was overdue on the old loans was funded into new bonds at par.

In 1906 the 6 per cent internal bonds of the Republic, which were mostly held in Europe, were converted into 3 per cent bonds at par.

These new bonds carried a sinking fund of 1 per cent per annum. Interest overdue on the old bonds was paid off to the extent of 50 per cent in non-interest-bearing bonds convertible into 3 per cent bonds according as the amortization of the latter issue took place.

Between the years 1906 and 1917 there has been a steady, consistent decrease in the outstanding external and internal loans. In 1906 the internal debt was £3,043,690; in 1908, £2,634,185; in 1910, £2,518,465; and in 1915, £2,401,261. The external debt, which amounted to £6,360,657 in 1906, was reduced to £5,836,659 in 1908, to £5,196,025 prior to December 31, 1910, and to £4,395,744 in 1915. During the period from August, 1905, to June, 1914, £1,219,100 bonds of the consolidated diplomatic debt were redeemed at a cost of £654,332, an average of £53,675 per £100 bond. Since the outbreak of the war certain difficulties have been encountered in the paying of interest and amortization of the debt. This was no fault of Venezuela, however, that Republic having been absolutely prompt in making all payments for the service of that loan and other loans. Owing to the fact that the Disconto-Gesellschaft, of Germany, acts for the European bondholders, other than the British bondholders, and that coupons were payable both in England and Germany, numerous complications arose. A similar condition existed in the operations of the amortization fund. So far as the British and neutral holders of the bonds are concerned, matters have been satisfactorily adjusted.

The high price for the 3 per cent diplomatic bonds since January 1, 1911, has been 61⅝ and the low price 45. The approximate price in January, 1918, was 57.

A recent statement of the Secretary of the Treasury of Venezuela indicated that the public debt of the nation amounted to the following:

	Bolivares.
Internal debt:	
National internal consolidated 6 per cent bonds	40, 700
National internal 3 per cent consolidated bonds	59, 068, 721
1 per cent bonds	38, 166
National internal consolidated debt (no interest)	1, 135, 645
Treasury bonds to bearer	349, 102
Total internal debt	60, 632, 334
External debt:	
National 3 per cent diplomatic debt	9, 723, 292
Diplomatic debt of 1905, 3 per cent	101, 267, 650
Other	1, 600
Total external debt	110, 992, 542
Total indebtedness of the Republic	171, 624, 876

The above total, equal to $33,123,601 United States currency, is somewhat larger than the amount of the debt on June 30, 1917.

The municipalities of Venezuela have no bonds outstanding, and no obligations of the various States are held publicly.

BANKS.

There are at the present time three important local banks in Venezuela. Of these, the Bank of Venezuela would probably take first rank. This bank has a capital of 12,000,000 bolivares. Its headquarters are at Caracas, and it maintains agencies at La Guaira, Puerto Cabello, Valencia, Maracaibo, Barcelona, and nine other cities and towns. It acts officially for the Government except in Caracas. The bank was founded March 24, 1882, as the Banco Comercial, its title being changed to the present one in the year 1890. Its 600 shares, which have a par value of 20,000 bolivares, are held by nearly 300 stockholders. Dividend payments during recent years have been quite substantial. Reserves are large, and the issue of bank notes has never exceeded 2,000,000 bolivares.

The Bank of Caracas is capitalized at 6,000,000 bolivares. Its headquarters are in Caracas, and a number of branches are maintained. The 600 shares (par 10,000 bolivares) are held by nearly 150 persons. The bank was incorporated in 1890, operating under a 40-year charter. It has paid fair dividends for a number of years.

The Bank of Maracaibo is more or less of a local institution, its operations being confined to Maracaibo and the western part of the Republic. Its charter dates from May 11, 1882, and its capitalization is 1,250,000 bolivares. The 3,750 shares (par value 300 bolivares) are distributed among nearly 175 holders.

As Consul Frank Anderson Henry states in a report dated March 11, 1918, banking facilities have been greatly improved in Venezuela within the last two years, during which period several foreign banks have entered the field. As is to be expected, the principal banks have their headquarters at Caracas, which is the commercial and financial center of the country as well as its capital.

The Royal Bank of Canada was the first foreign institution devoted strictly to banking to establish itself in Venezuela. It opened in Caracas in October, 1916, and has since established branches in Maracaibo, Ciudad Bolivar, and Puerto Cabello. This last-mentioned branch was opened in May, 1917, and is the only banking institution in that port that can supply the needs of commerce, as the agency of the Bank of Venezuela there can transact only a very limited class of business.

During the year 1917, the Mercantile Bank of the Americas, through a subsidiary, and the National City Bank have opened in Caracas. The former has established a branch in Maracaibo. Both banks will no doubt extend their activities to other parts of the country in the future.

Under Venezuelan law, Consul Henry says, any foreign bank properly chartered under the laws of its own country can come to Venezuela and do business. Before doing so, however, a certificate as to its charter must be produced and a copy of the bank act of the chartering country. These must be duly registered in accordance with local law. To become banks of issue banks must submit to a greater degree of Government control and supervision. None of the foreign banks are at present authorized to issue notes. The particular operations of banks are governed by a special statute and business operations in general by the code of commerce.

The foreign banks do a general banking business, consisting largely of commercial loans, usually made by overdrafts, exchange transactions, etc. Most of them do not, as a rule, make advances on products of the country, though this is done by the Venezuelan banks, and there is undoubtedly a considerable volume of this kind of business available. Interest rates, all things considered, are not high for a country where capital is so much needed, the usual rates being from 8 to 10 per cent per annum for commercial loans. Bank deposits are small and banks have in the past found themselves continually in the need of importing gold, inability to do which recently has completely upset the exchange market.

As the handling of drafts forms such an important part of Venezuelan banking business, the following points may be of interest in regard to them. Drafts of all kinds must bear stamps according to their value, as shown below:

Value of draft.	Stamp required.	Value of draft.	Stamp required
	Bolivar.		*Bolivar.*
25 to 50 bolivares	0.05	301 to 400 bolivares	0.40
51 to 100 bolivares	.10	401 to 500 bolivares	.50
101 to 200 bolivares	.20	501 to 1,000 bolivares	1.00
201 to 300 bolivares	.30		

For sums larger than those shown above the tax is 1 bolivar ($0.193) for each 1,000 bolivares or fraction.

Consul Henry says that in case of drafts from the exterior sent for collection, according to local custom the drawee does not pay collection charges or stamps. The purchaser of a draft in Venezuela pays for the stamps, though formerly certain banks used to assume this charge.

Banks do not accept consignments on account of customs laws, and for the same reason "to order" shipments are prohibited.

As has been frequently pointed out, sending drafts to banks with documents attached affords the foreign seller no protection, as the consignee named in the invoice can for a small fee obtain copies of the necessary documents from the customhouse.

Commercial information can usually be obtained from the banks, but there are no agencies devoting themselves exclusively to this business and care should be exercised by foreign houses in doing business with small and little-known merchants.

RAILWAY DEVELOPMENT.

Railway development in Venezuela has been slow in the extreme. There are no important lines in the Republic, the maximum length attained by any line being 111 miles. To give a description of the various railways in operation the report of United States Consul Homer Brett on "Railway Construction and Revenues in Venezuela" is quoted in its entirety, this most excellent report covering the subject thoroughly:[1]

With 530 miles of steam lines in operation, Venezuela has 7 feet of railway for each square mile of territory, and 11.8 inches per head of population. The average freight rate is 30.5 cents per ton-mile; the average passenger rate 6.57 cents per mile for first class and 4.6 cents for second class. All lines are narrow gauge, the various widths being 3 feet 6 inches, 1 meter (39.37 inches), 3 feet, and

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[1] Consul Brett's report extends as far as the heading "Securities and Quotations of British-Controlled Lines," on page 382.

2 feet. As a rule there is no interchange of cars between the various roads. Freights are based upon weights without regard to the class or value of the merchandise, and no reductions are made for carload or other quantity shipments. Upon the more important lines the equipment is of European origin and type. With two exceptions all the roads are short lines from a port to a city or a populated district on the highlands not far from tidewater.

Practically all the existing railways were built between 1881 and 1893 under Government subsidies and guaranties of interest upon the capital invested. This policy was greatly modified in 1892 and 1897, and as a result not a single mile of railroad was constructed. In 1912 the present law was passed, and in 1914 some extensions of existing lines were begun.

In 1895 the Government raised a loan of 50,000,000 bolivares ($9,650,000), with which three of the least profitable roads were taken over, the accrued debt upon the guaranties paid, and the guaranteeing clauses canceled in all contracts except that of the Puerto Cabello-Valencia Railway. In 1916 this company accepted £190,000 sterling ($924,635) in payment of all accrued indebtedness and for the cancellation of the interest guaranty for the future.

On several of the main roads traffic is lighter now than 25 years ago, and notwithstanding the fact that rail transportation is as costly as that by pack mule, scarcely any of the railway enterprises have earned a fair return upon the capital invested, though certainly transportation has been quickened and rates have been steadied if not cheapened. It is probable that in several cases capital investments have been smaller and earnings greater than the statistics indicate.

The reasons for the conditions shown lie in the sparseness of the population, and its distribution in a long narrow strip of territory skirting the seaboard, which leads to the building of unconnected lines with short hauls; in the moderate producing and consuming power of the people; and in the general refusal of the lines to grant low rates for commodities of small value.

In 1915 the total cargo movement over all railways amounted to 280,621 tons, which, on a basis of 300 working days per year, gives a daily movement of only 1¾ tons per mile of line.

BOLIVAR RAILWAY.

The Bolivar Railway (British capital) was the first road undertaken in Venezuela. Its object was to provide an outlet for ore from the copper mines in the State of Yaracuy. Construction was begun successively in 1835, in 1862, and for the third time in 1872. The main line was completed in 1877. It runs from the port of Tucacas (northwest of Puerto Cabello) to Aroa and Barquisimeto, and has a branch (opened to public service in July, 1916) from Palma Sola to San Felipe, the capital of the State of Yaracuy. The contract length is 218.5 kilometers (136 miles). The gauge is 2 feet, and the rail runs 48 pounds to the yard. The capital stock amounts to $6,822,550 United States currency. The maximum grade is 5.27 per cent, the minimum radius of curves 46.83 meters, ties are of wood and of steel, and there are 518 bridges having a combined length of 2,119 meters.

The road has 13 locomotives with a total weight of 294 tons, 9 passenger coaches, 69 flat cars, 61 box cars, and 125 stock cars. The passenger tariff is 5.8 cents per mile for first class and 3.8 cents for second. The freight rate equals 29 cents per ton-mile. From 1895 to 1902 the road's gross income decreased steadily until the latter year it was only $91,711, after which it rose to $506,590 in 1913.[1] This road has made efforts to encourage agriculture along its line. The general manager is Mr. C. A. Hutchings; address, the Bolivar Railway, Aroa, via Tucacas, Venezuela.

LA GUAIRA-CARACAS RAILWAY.

The La Guaira-Caracas Railway (British capital) was opened to service in 1883. It is 22 miles long, running from the port of La Guaira to the city of Caracas and climbing from sea level to a height of more than 3,000 feet. Although in appearance a dangerous line, it is so well constructed and so carefully policed that there has never been an accident involving loss of life. The gauge is 3 feet, the rail weighs 65 pounds to the yard, and ties are of native hardwood. The maximum grade is 3¾ per cent; the minimum radius of curves 43 meters. There are 15 bridges with a combined length of 281.55 meters and 8 tunnels with a total length of 379.5 meters.

The rolling stock consists of 15 locomotives, with a total weight of 520 tons, 28 passenger coaches, 20 flat cars, 63 box cars, and 34 stock cars. The passenger tariff equals 10.94 cents per mile for first class and 6.68 cents for second. The freight rate is 26.38 cents per ton-mile for import (up-grade) freight and two-thirds of this amount for export or down-grade, the former greatly exceeding the latter in tonnage.

The capital investment is stated as $3,508,740, and the capital stock of the company is $1,705,637. In 1917 gross revenues totaled $423,882 and operating expenses $201,517. The total income, including $6,857 brought forward from 1916, was $254,644. The dividend for the year was 6 per cent, free of tax, and the amount carried forward to 1918 was $15,651. The competition of pack animals, carts, and automobiles with the railway is keen, and will probably become keener unless the company reduces rates materially.

Although the tracks of the La Guaira Harbor Corporation are of the same gauge as the railway, the cars of the latter never go to ship side, and much cargo is unnecessarily handled twice. The gauge differs from that of the other railways centering in Caracas. This is the best piece of railway property in the country; with only one-twentieth of the total mileage, it transports nearly one-fourth of the freight handled by all lines. It is a steady dividend payer, and a generous portion of the earnings has been put back into the property. The general manager is Mr. James Flind; address, La Guaira-Caracas Railway, Caracas, Venezuela.

GREAT RAILWAY OF VENEZUELA.

The Great Railway of Venezuela (El Gran Ferrocarril de Venezuela, German capital) is the longest and most costly railway that has been constructed in Venezuela. It was opened to traffic in 1894, and cost $15,135,492, or an average of $85,226 for each of its 179 kilometers. This is a length of 111 miles. The road runs from Caracas westward to Valencia, the second city of the Republic, and its construction is much better than is justified either by the necessities or the possible traffic. It was built under a Government guaranty of interest upon the capital invested, which was later canceled in consideration of a cash payment. The gauge is 3½ feet; the rail weighs 47 pounds to the yard; the maximum grade is 2.2 per cent; and the minimum radius of curves is 75 meters. There are 219 bridges and viaducts, having a combined length of 4,656.4 meters, and 86 tunnels, totaling 6,249 meters. The ties are of steel and of concrete, and the rolling stock consists of 18 locomotives, with a combined weight of 720 tons, 30 passenger coaches, 68 flat cars, 60 box cars, and 19 stock cars. The passenger tariff equals 6¼ cents per mile for second class and 7.78 cents for first class, and the freight rate is equivalent to 15.65 cents per ton-mile. The freight traffic is small, and nearly half the revenue is from passengers carried. The best year was 1913, when gross receipts were $552,025 and a return of 1.6 per cent upon capital invested was earned. The management has attempted some development work in tree planting, the introduction of new crops, and the improvement of stock, but the grasshopper plague has affected the results. The company holds concessions for the construction of two branch lines southward into the llanos.

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[1] For the year ended June 30, 1918, gross receipts totaled $660,112, as compared with $595,538 in 1916–17.

PUERTO CABELLO-VALENCIA RAILWAY.

The Puerto Cabello-Valencia Railway (British capital) is 33½ miles long, and runs from the port of Puerto Cabello to the city of Valencia. It climbs over a pass 1,952 feet above sea level, and has at one point a rack-rail section 2.4 miles long with a maximum grade of 8 per cent, the steepest gradient on the smooth-rail sections being 3½ per cent. The gauge is 3½ feet; the minimum radius of curves 91½ meters; there are 33 bridges with a combined length of 915.5 meters and one tunnel 76.25 meters long. The rail on the rack section runs 70 pounds and on the others 55 pounds to the yard. Rolling stock consists of 10 locomotives with a total weight of 398 tons, 13 passenger coaches, 26 flat cars, 43 box cars, and 28 stock cars. The passenger tariff equals 7½ cents per mile first class, and 6 cents per mile second class. The freight rates are equivalent to 20 cents per ton-mile, though the road in the effort to increase the amount of down-grade or export tonnage has recently made reductions upon some articles. The capital investment is stated as $3,898,600. In 1917 gross receipts were $243,364 and operating expenses $152,059. The surplus, including $21,636 brought forward, was $71,411. A dividend of 1¼ per cent (less tax) was paid, $24,931 was placed to renewal and reserve accounts, and $25,496 was carried forward to 1918. The road was built under a Government guaranty of 7 per cent upon the capital invested. This rate was never earned, and there were years of dispute as to the amounts actually invested and actually earned. Some payments on this account were made; the guaranty was reduced to 5 per cent, and in 1916 it was definitely canceled in consideration of a cash payment of £190,000. The general manager is Mr. W. A. Littell; address, Puerto Cabello-Valencia Railway, Valencia, Venezuela.

CENTRAL RAILWAY OF VENEZUELA.

The Central Railway of Venezuela (British capital) has 73.5 kilometers (46 miles) of completed line and 23.5 kilometers yet to be constructed to complete its contract. It runs from Caracas in a general southeasterly direction toward Ocumare on the Tuy River, the town of Yare being the present terminus. The gauge is 3½ feet, the same as the Gran Ferrocarril, but wider than that of the La Guaira-Caracas railway. These are the roads centering in Caracas. The station is across the city from the others, and all transfer cargo has to be carted 2 miles. The capital stock of the company is 5,050,000 bolivares and the capital investment is 20,015,000 bolivares. The country traversed is classified as level 10 kilometers, broken 5 kilometers, rough 11, and mountainous 34. The average cost per kilometer is put at $67,722. The line began operations in 1887 and the gross receipts that year were 86,501 bolivares; they were 295,487 bolivares in 1891, but only 73,114 bolivares in 1902. Since then they have increased steadily, and were 765,929 bolivares in 1915. The maximum grade is 4 per cent, the minimum radius of curves 50 meters. There are 75 bridges and viaducts with a combined length of 724 meters, and 14 tunnels. Ties are of wood and of steel, and on some stretches the rails have been placed upon limestone blocks, but this proved unsuccessful and has been given up. The company operates an electric service over its lines as far as Petare.

The road has 8 locomotives weighing 277 tons, 13 passenger cars, 23 flat cars, 14 box cars, and 4 stock cars. The passenger tariff is equal to 3 cents per mile, and the freight rate to 27 cents per ton-mile. Since 1906 the business of this road has increased rapidly. The general manager is Mr. Albert Cherry; address, Central Railway of Venezuela, Caracas.

GREAT RAILWAY OF TACHIRA.

The Great Railway of Tachira (El Gran Ferrocarril del Tachira, Venezuelan capital) is 120 kilometers (74.5 miles) long and runs from Encontrados on the Catatumbo, a river emptying into Lake Maracaibo, southward to San Felix. It is the principal outlet for the State of Tachira, its capital, San Cristobal, and the Colombian Department of Santander. The gauge is 1 meter (3.28 feet), the rail runs 40 pounds to the yard, the maximum grade is 2 per cent, the minimum curve radius 75 meters, and there are 6 bridges with a total length of 332 meters. The country traversed for a distance of 110 kilometers is level, and for 10 kilometers it is broken. The average construction cost is given as only 61,135 bolivares per kilometer. Rolling stock consists of 7 locomotives with a total weight of 210 tons, 6 passenger coaches, 34 flat cars, 32 box cars, and 4 stock cars. The passenger tariff is equivalent to 6.8 cents per mile for first class and 3.4 cents per mile for second class. The northbound, or export, freight rate is 21 cents per ton-mile and the southbound, or import, rate 35 cents. The amount of cargo transported annually varies greatly, depending almost entirely upon the price of coffee and the size of the crop. In 1902, 11,113 tons, and in 1903, 27,582 tons were transported. The latter figure is the highest ever reached.

The capital stock of the company is 7,000,000 bolivares, or $1.351,000, fully paid in. American interests own some of the stock and, contrary to the usual rule in Venezuela, nearly all the material is of American origin. Owing to its moderate capitalization and construction cost this railway shows better returns than any other in

Venezuela. The gross earnings for 1913 were 10.88 per cent, compared with 8 per cent for the next best road. Its principal difficulties are with inundations by the Catatumbo River, which threaten the destruction of the port of Encontrados, and the greatest obstacle to the growth of its traffic is the fact that merchandise destined for its territory must undergo so many handlings en route that the cost is greatly increased and the consumption correspondingly diminished. The local address of this railway is Señor Pedro N. Olivares, Gerente del Gran Ferrocarril del Tachira, Maracaibo, Venezuela.

LA CEIBA RAILWAY.

The La Ceiba Railway (El Ferrocarril de La Ceiba, Venezuelan capital) is 50.6 miles long and runs from the port of La Ceiba on Lake Maracaibo toward the city of Trujillo in the State of the same name. The gauge is 3 feet, the rail weight 40 pounds to the yard, the maximum grade 3 per cent, the minimum curve radius 80 meters, and there are 37 bridges, with a combined length of 1,356 meters. Rolling stock consists of 6 locomotives, with total weight of 135 tons, 7 passenger coaches, 7 flat cars, 34 box cars, and 2 stock cars. The passenger tariff equals 5.3 cents per mile first class and 3.8 cents second class, and the freight rate is 31 cents per ton-mile.

Capital investment and capital stock are both stated as 8,000,000 bolivares ($1,544,000). Gross receipts were 1,285,872 bolivares in 1896, 582,160 bolivares in 1905, and 975,445 bolivares in 1915. When this line was only half its present length and the capital only 2,000,000 bolivares it earned 17½ per cent, whereas now its returns are only about 5½ per cent. In 1912 there were 21,051 tons of cargo transported, and in 1915 only 14,874 tons. Like most Venezuelan railways, this one suffers severely from the competition of the pack mule. The address of the company is Señor R. Belloso Rincon, Gerente del Gran Ferrocarril de La Ceiba, Maracaibo, Venezuela.

SANTA BARBARA-EL VIGIA RAILWAY.

The Santa Barbara-El Vigia Railway (Venezuelan capital), with 37 kilometers (23 miles) in operation, and a contract length of 60 kilometers, runs from Santa Barbara, a port on the Escalante River, which empties into Lake Maracaibo, toward the city of Merida in the State of the same name. The gauge is 1 meter (3.28 feet), the rail weight 40 pounds to the yard, the steepest gradient 2 per cent, the minimum curve radius 100 meters, and there are 15 bridges with a combined length of 138 meters. The rolling stock consists of 5 locomotives with a total weight of 124 tons, 6 passenger coaches, 12 flat cars, 14 box cars, and 1 stock car. The passenger rate is 6 cents per mile for first class and 4 cents for second class, and the freight rate equals 39 cents per ton-mile for imports and 34 cents per ton-mile for export cargo.

The construction cost is stated as 3,021,880 bolivares ($583,223). It was built by a French company, under guaranty, and was taken over by the Venezuelan Government in 1895. Gross receipts have increased steadily from 154,020 bolivares in 1909 to 465,869 bolivares in 1915. In 1892 the road was partially destroyed by an inundation of the Chama River; from that year locomotives operated only to kilometer 37 and cars were drawn by mule power to kilometer 47, where pack transport began, but in June and July, 1915, new floods of the Chama destroyed still more of the line. The Government has appropriated its rental to reconstruction, and the work is progressing.

Of the three lines owned by the Government this is the only one that shows an operating profit. It is not managed directly, but is leased to Señor J. A. Redondo, Santa Barbara, Venezuela.

GUANTA-NARICUAL RAILWAY.

The Guanta-Naricual Railway (Venezuelan capital) is 25 miles long and runs from the port of Guanta (situated east of La Guaira) to the city of Barcelona and the coal mines at Naricual. It was built under a guaranty of interest and was bought by the Government in 1895. The gauge is 3 feet 6 inches, the rail weighs 40 pounds to the yard, the maximum grade is 2½ per cent, and the minimum curve radius 125 meters. There are 6 bridges with a combined length of 265 meters. The rolling stock consists of 3 locomotives weighing altogether 60 tons, 8 passenger coaches, 6 flat cars, and 6 box cars. The passenger tariff is 6⅗ cents per mile for first class and 5 cents per mile second class, and the freight rate is equal to 34 cents per ton-mile. The capital investment is given as 5,199,745 bolivares. The gross income in 1892 was 109,445 bolivares, and with occasional and slight recoveries fell continually until, in 1913, it was only 58,625 bolivares. In 1915 receipts were 103,023 bolivares, or 8,124 bolivares less than expenditures.

The road is operated by the Government through an administrator who also manages the coal mines at Naricual and the pier at Guanta. In October, 1915, the Neverí River was declared open to coastwise navigation. This decision caused a great decrease in the amount of cargo carried by the railway between the city of Barcelona and the port of Guanta, so that now the line is almost entirely dependent upon the freight paid by coal from the mines at Naricual. The address of the manager is Señor Juan G. Aldrey, Administrador del Ferrocarril de Guanta a Naricual, Barcelona, Venezuela.

CARENERO RAILWAY.

The Carenero Railway (French capital) is 34 miles long and runs from the coasting port of Carenero along the coast, serving the cacao-producing section known as the "Barlovento." The gauge is 3 feet, and the rail runs 40 pounds to the yard. Rolling stock consists of 5 locomotives weighing altogether 90 tons, 5 passenger coaches, 6 flat cars, 22 box cars, and 9 stock cars. The passenger tariff equals 6.28 cents per mile, and the freight rate 46.6 cents per ton-mile. Despite these rates the line has shown a favorable balance in only 4 years out of the last 27. The heaviest traffic was in 1910, when 9,937 tons of freight were transported. In 1915 tonnage was 7,506, and the gross income was 312,614 bolivares, or 21,749 bolivares less than expenses. The road's management also runs a steamship line between Carenero and La Guaira. The owner is Sr. Victor Crassus, of Caracas, and the manager is Sr. R. E. Crassus, of Rio Chico, Venezuela.

CORO-LA VELA RAILWAY.

The Coro-La Vela Railway (Venezuelan capital) is only 8¼ miles long, and its construction cost is 1,040,000 bolivares ($200,720). It connects the port of La Velà with the city of Coro, and is national property. It is operated by Sr. José M. Capriles as agent of the Government. The road has 2 locomotives, 1 passenger car, 1 flat car, and 1 box car. Gross receipts were 68,098 bolivares in 1898, and 35,893 bolivares in 1915. For the 8½ miles the price of passage is 2 bolivares (38.6 cents), and the freight on a ton of merchandise 20 bolivares ($3.86). Lower rates have been authorized for freight, but in the correspondence it was stated that these were to be temporary, lasting only until the carters gave up competing with the railway and found other employment. At present the line barely pays expenses.

LINES AND EXTENSIONS CONTEMPLATED OR SUGGESTED.

The Caribbean Coal Co. obtained in 1917 a concession for a railway from deep water to its mining property on Lake Maracaibo. The plan calls for the construction of a port at Castilletes capable of admitting vessels drawing up to 35 feet at all times and provides that no port charges of any kind shall be collected. There is now about 16 feet of water at Castilletes. From the port a railway 150 kilometers (93 miles) long and with branches of 50 kilometers (31 miles) in length is to be constructed. The line is to be of standard American gauge and is to have a one-way capacity of 10,000 tons daily. The maximum freight charges permitted are lower than the minimum now charged on existing lines in Venezuela.

The coal on the property of this company is said to be of the very best quality and to exist in large quantity. The port of Castilletes will be only 595 miles from Colon. Its establishment as a free port in so far as port charges are concerned will probably affect adversely the prosperity of Curaçao and will bring changes to Maracaibo. Should the construction of the port and railway and the development of the mines be carried out according to the program announced, this will be the most important industrial event that has occurred in Venezuelà for many years.

Caracas newspapers announced early in 1917 that Dr. Manuel Silviera and Mr. C. A. Hutchings were seeking a concession from the Government for the construction of a railway from El Palito, near Puerto Cabello, to the station of La Rosita on the San Felipe branch of the Bolivar Railway. At present the Bolivar Railway, which runs from the port of Tucacas to San Felipe and Barquisimeto, is entirely separated from all other lines; the proposed link, about 40 miles in length, would connect it up with the road from Puerto Cabello to Valencia, and thus with the several lines radiating from Caracas, greatly facilitating communication between the capital and the important States of Yaracuy and Lara. Mr. C. A. Hutchings, as previously stated, is the general manager of the Bolivar Railway.

The Great Railway of Tachira holds a concession for 20 years from 1913 for the extension of its line to the city of San Cristobal, and a preference for building thence to Periquera at the junction of the Apure and Uribante Rivers. The latter extension would extend into the plains, and would develop a large section of good cattle country.

The Bolivar Railway contemplates several extensions and branches at some future time, but construction is not expected soon.

The Great Railway of Venezuela has a concession for the extension of its line from Valencia to San Carlos and the preferential right to construct a branch from Cagua to Villa de Cura and Calobozo, both San Carlos and Calobozo being situated in good but only slightly developed cattle country.

A railway 108 kilometers (67 miles) long from Valencia westward through five towns to Nirgua in the State of Yaracuy has often been suggested, but as the country is rough it is possible that such a line could not be built cheaply enough to pay. The manager of the Puerto Cabello-Valencia Railway was granted a concession for a cableway over this route.

The excellence of the harbor of Guanta has suggested many projects for roads thence into the interior, but as these districts are practically uninhabited every one of the proposed roads would have to await a problematical development of the country before getting returns.

In the southernmost States of Venezuela and in eastern Colombia land values are merely nominal, but with adequate transportation this would be one of the great meat-producing areas of the world, with the advantage of being thousands of miles nearer to consuming centers than Australia or the River Plate. Running for the most part over level, treeless plains, a railway would not be costly, but notwithstanding this fact there is no indication that its construction is being considered at present.

NEW LAW GOVERNING RAILWAY CONCESSIONS.

A new law governing railway concessions passed the Venezuelan Congress and was signed by the Provisional President June 12, 1917. The principal difference between this law and the former one is that the provision by which all railways constructed under concessions became the property of the Government after a specified term of years is changed, and railways to be built under the new law will be fully and perpetually the property of the parties constructing them except that such ownership may not be transferred in whole or in part to any foreign Government. It is hoped that under the more liberal terms of this new law foreign capital may undertake the construction of railways which the country so badly needs for its internal development.

SECURITIES AND QUOTATIONS OF BRITISH-CONTROLLED LINES.

The following table will indicate the amount of securities outstanding and the quotations thereof of important British-controlled railways in Venezuela:

Securities.	Amount	High price since 1911.	Price January, 1918.
LA GUAIRA-CARACAS RAILWAY.[a]			
Stock	£350,000	95	92
5 per cent debenture stock redeemable 1982	370,000	100	78
PUERTO CABELLO-VALENCIA RAILWAY.[b]			
Shares (£10 par)	460,000	3¾	3
5 per cent first-charge bonds	170,000	95	74
5 per cent second-charge bonds	170,000	86	(c)
BOLIVAR RAILWAY.[d]			
Ordinary shares (par £1)	683,200	18s. 9d.	7s. 2d.
5 per cent preference shares (par £1)	292,800	17s. 6d.	13s.
6 per cent debenture stock	250,000	106	83
6 per cent scrip	23,241	....	80½
CENTRAL RAILWAY OF VENEZUELA.			
Stock	200,000	(e)	(e)
6 per cent first debentures [f]	240,000	81	48
6 per cent second debentures	134,000	35	12½

[a] Dividends of from 5 to 8 per cent per annum have been paid during the period 1910 to 1917, inclusive (1917 dividend, 5 per cent).

[b] A dividend of 10s. was paid on the stock in March, 1917.

[c] No longer quoted.

[d] Preferred dividends have been at the annual rate of 5 per cent, 1910 to 1913; the 5 per cent declared in 1914 and the 3 per cent in 1915 were paid in 6 per cent scrip, as above, to be converted into 6 per cent debentures prior to Dec. 31, 1918, or, if not converted, to be paid off at par as soon as possible. All subsequent preference dividends have been at the full rate. In 1912–13, 2 per cent was paid on the ordinary stock; no other dividend on this stock has been paid.

[e] Not quoted.

[f] Interest on first debentures is dependent on income until paid in full for three consecutive years; rate for 1917, 3 per cent

PUBLIC UTILITIES.

Public-utility development in Venezuela has progressed along modest lines. A number of the larger cities and towns have electric lights and there are electric traction lines or tramways otherwise propelled in Caracas, Valencia, Maracaibo (two), La Guaira (the line to Macuto), and Cumana. There is a large telephone company in Caracas, which reaches out into the country, and a smaller local concern operating to the eastward of Caracas. The capital city is the home of a substantial number of public-utility enterprises, most of which are described in the Appendix (see p. 526). The Caracas Electric Co. utilizes El Encantado Rapids in the Guare River for the generation of the power. The fall of the rapids is 111 feet and the horsepower developed is 1,050. Another plant at Los Naranjos, 2 miles higher up the river, furnishes an additional 1,500 horsepower. The water supply in the important centers is said to be good and ample. Merida, capital of the mountain State of the same name, is one of the electrically lighted cities; the power is furnished by the torrential Chama River, the plant being located at a point somewhat above the city. At last accounts the number of lights installed was far in excess of the capabilities of the existing power plant, although much greater horsepower might readily be obtained. There is, needless to say, still much to be done in the public-utility development of the Republic.

MINING ENTERPRISES.

There are four minerals existing in the Republic of Venezuela that have become commercial commodities—copper, gold, coal, and iron.

COPPER.

Copper ores are known to exist in the States of Carabobo, Lara, and Merida. The important mines worked to-day are the Aroa mines owned by the South American Copper Co., a British company. These were formerly operated as the Quebrada mines, and were worked by aborigines before the coming of the Spaniards. Early in the nineteenth century a company, with head office at Baltimore, Md., operated the most important of these mines and obtained about 43,000 tons of high-grade carbonate and oxide ores. Later the mines were taken over by Venezuelan interests and still later by a British company. The Venezuelan company, it is said, obtained about 100,000 tons of medium and high grade ore. Between the years 1873 and 1894 the mines were actively operated by the Quebrada Land & Copper Co., and about 271,770 long tons of ore were produced. The maximum production during this period was for the year 1891. Adverse political conditions, a severe flood, and declining prices for the mineral brought about the closing of these mines, and operations remained practically at a standstill until the South American Copper Syndicate was organized in 1907 to acquire and work the property. The capitalization of this company is only £15,000 (par 2s.), and phenomenally large dividends have been paid. In 1908–9 the rate was 25 per cent; in 1909–10, 30 per cent; 1910–11, 145 per cent; 1911–12, 250 per cent; 1912–13, 350 per cent; 1913–14, 75 per cent; 1914–15, 62½ per cent; 1915–16, 150 per cent. Only ore averaging 8 per cent or more was shipped to Europe for smelting purposes. The company decided several years ago to erect a smelter to treat the lower-grade ore that exists in large quantities. The company is being repaid for its investment in the property many times over, and its shares command a very high premium. The mines are located along the line of the Bolivar Railway, which runs from the port of Tucacas to Barquisimeto, and the copper forms the principal source of revenue for the railway.

Copper mines were worked with profit, in former times, at Seboruco, Bailadores, and other places in the Andes and the Caribbean hills. The industry seems to hold the promise of satisfactory development when better means of transportation are available.

GOLD.

Gold has been found in almost every State in Venezuela. In Guayana large quantities of the mineral have been produced, and new discoveries are being rather frequently reported. El Callao mine, located near Guasipati, a town situated on the right bank of the Yuruari River, was formerly important. The mine was worked by the Indians in early days, as were numerous other gold discoveries in the neighborhood. In the year 1870 the El Callao Mining Co. was formed and during the period 1871 to 1892 paid in dividends the sum of 48,322,000 francs, or £1,933,288. The company during the later years of its existence became involved in lawsuits, and very little work has been carried on since dividends were suspended in 1892. Other mining properties that have been operated at various periods include the Chile, Choco, Nacupai, Potosi, Union, Victory, etc.

Under existing conditions Venezuela offers better opportunities for the individual prospector than for the large companies equipped with costly machinery. Transportation and freight costs to the mines, most of which are not easily accessible, are prohibitive, and there are many other difficulties to be encountered.

In the Amazonas Territory gold is produced, the natives carrying considerable quantities of the dust into British Guiana to exchange for rifles and ammunition. There is a large stretch of country in this Territory that is similar in composition to the gold-producing areas in which the El Callao mines are located. This mining country, however, is almost inaccessible.

It may readily be seen that lack of proper transportation facilities greatly retards the development of the gold-mining industry. The distance of 130 miles from the port of San Felix (on the Orinoco River, below Ciudad Bolivar) to Guasipati requires a journey of from 10 to 20 days for wagons, the trail being frequently a sea of mud. Once railways or automobile roads are opened into this interior fastness, the probabilities are that the gold industry will greatly increase in importance.

COAL AND IRON.

Coal has been found in various sections of the Republic. The quality of the mineral is fair, and the product is in great demand locally. The principal mines are at Naricual, about 16 miles from Barcelona. The coal there is of a later geological period than British coal and is a bright burning variety. It is used on the various local steamers and on some of the railways, and is also mixed with pitch from Trinidad into briquettes. The Guanta Railway, the coal mine, and a small briquette factory are all local industries controlled and operated by Venezuelans. Small coal mines have been operated on and near the shores of Lake Maracaibo, and outcroppings have been found in the States of Merida, Tachira, and Trujillo. A mine was opened a short time ago along the Unare River, about 120 miles from La Guaira and about 15 miles west of the Naricual mines. The mine is said to be located less than 5 miles from tidewater and immediately upon the bank of the river. Production was stated to amount to upward of 20 tons a day, with prospects of considerable future increase. According to Consul Homer Brett, of La Guaira, the mine is under the management of Dr. Andrés Hernandez Caballero, Puerto Unare.

The iron-ore deposits of Venezuela occur mostly in the extreme eastern section of the Republic. Ore has been shipped from the country at various times, a consignment of several hundred tons sent to the United States in 1901 being examined and described as magnetic carrying upward of 60 per cent of ore. In 1910 a company, known as the Canadian-Venezuelan Ore Co. (Ltd.), was formed and received a concession for the whole of the known iron-bearing territory. The company agreed to pay to the Venezuelan

Government $0.20 per ton of ore, in addition to an initial payment, until $385,000 had been paid, and $0.10 per ton thereafter. The capitalization of the company consisted of $1,000,000 first-mortgage 6 per cent bonds due 1927 and $4,347,500 common stock. The enterprise was presumably unsuccessful, and the company went into liquidation in 1913.

OTHER MINERALS.

Salt constitutes a Government monopoly. It is gathered in the State of Zulia, and a large amount is annually shipped into Colombia. The salina of Araya, located on a peninsula of the same name, not far from the port of Cumana, is probably the most important salt deposit in the Republic. This is an extensive surface deposit of pure sodium chloride. The usual method employed in gathering the salt is to dig pits and fill them with water in such a way as to dissolve the salt of the surrounding sands and clays, to be later evaporated to dryness in the sun. Salt deposits also occur near Barcelona, on the island of Coche (near the Peninsula of Araya), and elsewhere.

Sulphur exists about 11 miles inland from the port of Carupano in what appears to be commercial quantities. A company, incorporated in Germany, was formed in 1903 to work this deposit. The capitalization of this company was said to have been 2,000,000 marks.

A very large variety of other minerals have been located in various portions of the Republic, but presumably none of them have as yet been developed commercially. The mineral resources of the country are certainly very great, and a promising future is surely in store for the industry, once better systems of roads, railways, and other means of interior communication are established.

PEARL FISHERIES.

The pearl fisheries of Margarita Island have been of importance for centuries, although the production of modern times has been far less than during the early days of Spanish rule. Pearling is the chief industry of the island and its neighbors, and a large number of the inhabitants are employed on the sloops and pearling vessels. Approximately 400 boats and 1,600 people were engaged in the work according to recent statistics. Mother-of-pearl is also a commercial product of Margarita Island.

THE PETROLEUM INDUSTRY.

The petroleum fields of Venezuela have attracted a good deal of attention during the past three or four years. New deposits are coming to light from time to time, and a fair amount of American, British, and Dutch capital is being attracted. The Government of Venezuela is doing what it can to assist in the development of the industry. The principal fields thus far located are: (1) The Bella Vista, near Maracaibo; (2) in the Mara district, near the Liman River asphalt lake; (3) on the Sardinate River, which runs into Colombia; (4) in the district of Colon, State of Zulia, south of Lake Maracaibo (largest field in Venezuela); (5) in the district of Sucre, on Lake Maracaibo; (6) the Perija field, to the west of Lake Maracaibo; (7) the Pedernales field in the delta of the Orinoco, where one of the river outlets empties into the Gulf of Paria. This last is on the properties of the General Asphalt Co. (see p. 391). An extensive article, "Venezuela's Petroleum Industry," written by the American Minister to Venezuela, Hon. Preston McGoodwin, is here reproduced in full:[1]

There are in Venezuela six petroleum companies engaged in development work on an extensive scale—the Caribbean Petroleum Co., the Colon Development Co., the Venezuelan Oil Concessions (Ltd.), the Venezuela-Falcon Oil Syndicate (Ltd.), the Bermudez Co., and the Pauji Concession.

CARIBBEAN PETROLEUM CO.

The first-mentioned of these—the Caribbean Petroleum Co.—acquired what was known as the Tregelles concession from the General Asphalt Co., and during 1912 and 1913 employed a force of 35 experienced geologists, assisted by a great number of Venezuelan civil engineers, who covered nearly every foot of territory included in the concession. At the end of two years the company had staked out and definitely selected 1,028 areas of 500 hectares (1,235 acres) each, in which it intended, within the time allowed, to drill for oil.

For its preliminary work the company selected two sections for drilling, one on each side of Lake Maracaibo, State of Zulia, in the extreme northwestern part of Venezuela. One of these sections is 16 miles east of the lake, where material has to be transported through swamps over a road built by the company. When the road was completed and properly screened houses had been erected for the employees, drilling equipment for three wells was immediately shipped in and drilling commenced in January, 1914. On this area the company has drilled six wells, from 600 to 1,700 feet in depth, in all of which oil has been found. Enough work has been done to prove conclusively that this is a commercial field. Most of these wells are capped.

The company has erected three 55,000-barrel steel tanks, has laid a pipe line to the shore of Lake Maracaibo, and has built a refinery at the terminal of its pipe line at a place called San Lorenzo, 60 miles south of Maracaibo. This refinery began operations on August 16, 1917, and is expected to supply a large proportion of Venezuela's consumption of gasoline and kerosene. It has a daily capacity of about 2,000 barrels (of 42 gallons each). Every grade of oil except lubricants will be refined at this point. Pumps and pipe lines have been installed for loading tank steamers or barges for the shipment of the oil from Venezuela.

The field selected by this company on the western side of Lake Maracaibo is about 50 miles from the shore of the lake, and a road had to be built to it for the transportation of material through a flat but heavily wooded country. As on the east side of the lake, the company delivered to this site equipment sufficient for drilling three wells. Two wells were sunk to a level of about 1,000 feet and abandoned prior to April, 1915. In June, 1916, work was started on four additional wells in this section for testing purposes.

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[1] The American Minister's report extends as far as the heading "Development of Asphalt Deposits," on page 391.

The same company is developing areas in other sections, as it is required to do under the terms of its contract with the Government of Venezuela. Although the section on the east side of Lake Maracaibo undoubtedly contains oil in quantities sufficient for commercial development, no information is obtainable upon which to base an estimate of probable future production.

COLON DEVELOPMENT CO.

Under what was known as the Andrés Jorge Vigas concession, granted January 3, 1907, for oil rights in the district of Colon, State of Zulia, the Colon Development Co., an English corporation, commenced drilling operations early in 1914. This company encountered difficulty in its geological exploration work, owing to roving bands of Motilones Indians. It was necessary to employ from 60 to 100 armed guards with the exploring parties, and a force of 50 to 60 guards has been kept at the drilling camps.

Development was started by this company about 100 miles from the nearest settlement, and, although there are rivers for transporting material, it was necessary to expend immense sums in delivering equipment. The first drill was started the latter part of 1914, and after great difficulties had been experienced with drillers and laborers the first well was abandoned at a depth of 700 feet. The company had just succeeded in drilling its second well on the Rio Oro. The depth attained is somewhat over 1,000 feet, and the oil is of light gravity. The capacity of this well is said to be approximately 200 barrels a day. However, means of transportation must be provided, and the company is now engaged in building roads for that purpose; also in drilling another well on the Rio Tarra, now said to have reached a depth of about 500 feet.

The best information to be had from persons who are familiar with the territory occupied by the Colon enterprise is to the effect that the company will produce oil in commercial quantities.

VENEZUELAN OIL CONCESSIONS.

On February 28, 1907, a contract was granted to one Antonio Aranguren for the development of asphalt in the districts of Bolivar and Maracaibo of the State of Zulia, and on June 18, 1912, a decree was issued by the Government of Venezuela, bestowing upon the concessionaire the right to exploit petroleum. Some question has been raised as to the legality of this latter decree, but, notwithstanding protests made by other oil-producing companies, the decree has been allowed to stand. In the latter part of 1913 it was transferred, after preliminary geological investigation, to the Venezuelan Oil Concessions (Ltd.). This concern, which is a subsidiary of the Royal Dutch Co. for the Working of Petroleum Wells in Netherlands India (Dutch Shell Co.), is incorporated in Great Britain with an authorized capitalization of £500,000, of which £355,000 has been subscribed and called up.

Four drillers and an office staff and field superintendent were sent out from London late in 1913 by this company. Two wells were started immediately, one at a point on the shores of Lake Maracaibo called Santa Rita, and the other in the swamp just south of Santa Rosa, also located on the shores of the lake. Drilling in the Santa Rita well was carried to a depth of 1,600 feet without any trace of oil having been encountered. At Santa Rosa an oil sand of good promise was encountered at 800 feet, and at 1,500 feet another sand was found which produced oil of about 20° B. Undoubtedly upon striking this last sand a great quantity of oil was produced, but 10 days after the strike the production was not more than 10 barrels a day. Apparently no attempt was made to pump this well, and it seems to have been abandoned.

The company encountered very great obstacles because of the general unhealthful conditions under which the men were compelled to work and the impossibility of keeping them protected from the very dangerous malarial mosquito found in those localities. Also, the company seemed to realize, about the middle of 1914, that the system used in drilling was not suitable to the conditions and placed an order for drilling equipment in the United States. It was planned to start work with this new machinery immediately, but operations were seriously hampered by the outbreak of the European war.

Although work has been carried on continuously, it has been done with a very limited force, and no very satisfactory results have been obtained. At last accounts the company had succeeded in drilling seven wells, varying in depth from 600 to 1,800 feet and scattered over a considerable area. It has been reported that oil was found in five of the seven wells, and that at least two of them give promise of good production.

VENEZUELA-FALCON OIL SYNDICATE.

On July 22, 1907, there was granted what is known in Venezuela as the Bernabe Planes concession for the development of oil in the district of Buchivacoa, in the State of Falcon. After it had been offered for sale for a number of years an option was given in 1913 to an English company called the Venezuela-Falcon Oil Syndicate (Ltd.). After preliminary investigations lasting about a year and a half, the company finally agreed to start development work, but it appears that the equipment has not yet been delivered.

BERMUDEZ CO.

On July 24, 1910, the General Asphalt Co., which owned the large asphalt deposit known as Bermudez Lake, situated in the extreme northeastern part of Venezuela at a place called Guanoco, obtained a concession for the oil rights in the vicinity of the lake; also on the island of Pedernales and the peninsula of Paria. This concession, obtained by R. M. Valladares, was transferred to a subsidiary of the asphalt company called the Bermudez Co. Very soon after acquiring the right the Bermudez Co. sent a force of 10 geologists over its concession and finally selected 19 areas of 500 hectares (1,236 acres) each in the vicinity of the asphalt lake, 6 areas on the peninsula of Paria, and 4 areas on the island of Pedernales. The terms of the concession of the Bermudez Co. called for almost immediate exploitation of all areas selected. By June, 1913, wells were being drilled in all of the 29 areas. On the 6 areas on the peninsula of Paria wells were sunk deep enough to demonstrate the impossibility of producing oil in commercial quantities, and all of them were promptly abandoned.

At Pedernales the company drilled seven wells ranging in depth from 200 to 1,000 feet, occasionally finding traces of oil, but not in sufficient quantities. In this region the company encountered great difficulties because of heaving sands, soft mud, and gas pressure, all of which made it necessary to adopt several methods of drilling.

In the Guanoco area wells have been sunk in varying depths from 200 to 4,200 feet. In some of them a heavy oil, almost an asphalt, has been found, and invariably in fair quantities, but it is too heavy to pump. Two additional wells have been started in this region recently, but no commercial results have been obtained. The company has done considerable geological work to locate a proper place to drill where it could reach oil, which is still believed to exist in large quantities in that district.

The operations of this company have been exceedingly difficult, because nearly all of the wells in the three regions described are located in swamps, and it has been necessary to lay portable tracks on trestles to transport drilling material. Although the general camp of the company was located at the same place as the headquarters of the General Asphalt Co., where several hundred employees are maintained constantly, yet the field camps have been in very unhealthful places and there has been considerable sickness among the employees.

PAUJI CONCESSION.

On January 16, 1909, a petroleum concession was granted to Joaquin Briceño on 3 hectares (7.4 acres) of land adjoining a place known as Pauji, 30 miles east of Lake Maracaibo. The right was secured doubtless because of the abundant evidence of asphalt seepages, which are very numerous in that locality. A company was formed in the city of Maracaibo with a large nominal capital but with only about $50,000 for actual work. An American has been investigating the property, and it is reported in Caracas that drilling machinery will shortly arrive. Stockholders are confident that development work will be pushed rapidly.

In addition to the properties of the six companies above enumerated, there are not more than three or four ancient and modern concessions in existence, and no other development is now known to be in progress.

OIL AND COAL DEPOSITS ADMINISTERED BY GOVERNMENT.

A resolution of the Venezuelan Minister of Fomento (Development), published November 28, 1917, provides as follows:

> The Provisional President of the Republic directs that in conformity with article 3 of the law of mines the petroleum and coal deposits in the States of Trujillo, Merida, and Zulia which are not already leased and which belong to no private parties or companies, shall be administered henceforth by the Federal Executive.

In another resolution of the same date announcement is made of the appointment of an Administrator of Mines for the district mentioned.

The purpose of these measures is to provide a new source of income.

DEVELOPMENT OF ASPHALT DEPOSITS.

The General Asphalt Co., an American corporation, leases for 99 years, through its subsidiary, the New York & Bermudez Co., the celebrated Bermudez Pitch Lake, near Guanoco, and fee-simple titles to 4,800 hectares (11,861 acres) of land underlying or surrounding the lake. The area covered by the pitch deposit is larger than the famous pitch lake of Trinidad, but the depth is said to be somewhat less. The capitalization of the General Asphalt Co. consists of $17,000,000 common stock, $14,000,000 preferred stock, $1,900,000 6 per cent gold debentures, and $1,083,975 New Trinidad Lake first-debenture sixes, due 1925. The General Asphalt Co. and its subsidiaries reported gross earnings of $11,677,309 for the year ended January 31, 1917, as compared with $15,279,352 earned during the year ended January 31, 1914. Surplus applicable to dividends reported in 1916–17 amounted to $921,965, as compared with $1,303,755 in 1913–14. Dividends of 5 per cent per annum have been maintained on the preferred stock for some years. The company's interests in petroleum concessions have been dealt with briefly in preceding paragraphs. Bermudez Asphalt Lake in eastern Venezuela and Trinidad Asphalt Lake in the island of Trinidad, British West Indies, are the two largest reservoirs of evaporated petroleum in the world. Bermudez Lake covers 1,100 acres, and the asphalt contained therein represents an outflow of 80,000,000 barrels of oil. There is a constant flow of oil, which spreads out over the lake, replenishing it. The seepages are found on a line from one end of the lake to the other, on its longest axis, up to a thousand feet wide. The immense accumulation of asphalt and the broad belt of active seepages are proof of oil-bearing formations below. At nearly all places in the world where commercial quantities of oil have been found underground, especially in much folded or faulted regions, adequate evidence of its presence is given by surface seepages. The structural conditions at Bermudez Lake are an anticlinal fold, along the crest of which the seepages occur, in which the folding strain caused fracturing, followed by cross folding and fracturing and faulting of the strata and the forming of a dome. The formation consists of massive black shale, a layer of coarse sandstone, and thick beds of fossiliferous limestone. The limestone is supposed to be the source of the oil and the sandstone its reservoir, whence it escapes to the surface along the fault line.

Referring to the General Asphalt Co.'s interests in the petroleum deposits of western Venezuela, the company's reports for several years past have described conditions and progress. Several paragraphs from these various reports are here reproduced. The annual report for 1912 states as follows:

> Our subsidiary, the Caribbean Petroleum Co., has a concession from the Government of Venezuela dated January 2, 1912, for the petroleum rights in the following States in Venezuela: Sucre, Monagas, Anzoategui, Nueva Esparta, Tachira, Trujillo, Merida, Zulia, Lara, Falcon, Carabobo, Yaracuy, and the delta of the Orinoco. The concession provides for an exploration period of two years, to be followed by a lease for 30 years of such parts of any of such States not previously occupied by similar concessions as we shall have filed upon in due

course for permanent operation in lots of 1,250 acres each, upon which we shall pay 8 cents per acre per annum land tax and a royalty on petroleum produced and shipped at the rate of 40 cents per ton, equal to about 10 per cent on oil produced and shipped.

The company's report for 1915 stated that immediately after the concessions in western Venezuela had been obtained geologists were sent to investigate the field thoroughly. In the early stages of this work it became apparent that the total oil-bearing area covered by the Caribbean Petroleum Co.'s concession would be very large, and that the proper development of the field would require far more capital than the General Asphalt Co. cared to spend. Therefore it was decided by the directors, after consideration, that it would be wise to make arrangements whereby experienced and highly successful interests possessing ample capital would undertake the development of this large property at their own expense and risk. The essential features of the arrangement entered into with such interests, as quoted in the annual report for the year 1915, were as follows:

> (1) A repayment to the company of its disbursements in connection with all of the areas in Venezuela other than those immediately adjoining the Bermudez Lake property, which areas have been reserved for the exclusive use of the company itself.
>
> (2) A substantial participation in the entire net profits of the enterprise without obligation to furnish any part of the capital required.
>
> (3) A contract for the life of the concession whereby the company has the right to purchase petroleum for its own business and purposes, with ample protection to its asphalt business.
>
> After making these arrangements the work of exploration was continued under the immediate supervision and direction of the General Asphalt Co., with increased field forces, and the most thorough examination possible was made of all oil-bearing areas in Venezuela. As a result of this work title was perfected to oil rights upon 1,028 areas of 500 hectares each, a total area of 514,000 hectares, or about 1,259,580 acres.
>
> After the perfecting of title to these areas a period of three years is allowed by the concession for the purpose of commencing development work, which must consist of one well upon each area, with, however, the privilege under certain circumstances of securing one extension of three years additional for this purpose.
>
> The greater part of these areas lie in the wild and undeveloped portions of the country, but are reasonably accessible to the shores of Lake Maracaibo, whence oil may be transported by pipe lines and thence by tank steamer. Of the total of 1.028 areas of 500 hectares each, 789 areas are in western Venezuela, in the Maracaibo region, and 239 in eastern Venezuela, accessible to the Gulf of Paria. Assuming that after further critical examination a considerable percentage of these should ultimately be abandoned, there still would remain an enormous area for development, requiring the immediate expenditure of many millions or tens of millions of dollars.

A few years ago a German company acquired a concession to develop asphalt deposits at Pedernales. A small amount of asphalt was shipped, but the company, after an ineffectual struggle, finally abandoned the property. The asphalt and oil refineries are now in ruins.

FOREST PRODUCTS.

The forest resources of the Territories of Guayana and Amazonas are unlimited. In the Guayana forests will be found the giant mora tree, averaging 3 feet in diameter and seldom branching at less than 40 feet from the ground. This timber, dark-red grained, is said to be most excellent for shipbuilding purposes. Mahogany, Venezuelan rosewood, and other hardwood trees are found in profusion. In Venezuela the same difficulty is met with as in the forests of British Guiana—namely, the growth of a very mixed assortment of trees, this difficulty standing in the way of profitable development unless such development is carried on in a very extensive way.

Wild rubber, balata, vanilla, tonka beans, and other products of the tropical forests are gathered and exported largely through the Orinoco River port of Ciudad Bolivar. Some mangrove bark is also shipped abroad, as are a few Brazil nuts.

It is safe to estimate that more than 50 per cent of the entire area of Venezuela is under forests. It is therefore evident that, as the country develops through the possible influx of population, more attention will in future be given to the vast forest resources, especially with the improvement in transportation facilities that is certain to follow immigration.

STOCK RAISING AND THE MEAT INDUSTRY.

The cattle-raising industry of Venezuela is capable of great development. Much has been said concerning the capabilities of the vast llano territories for the raising of cattle, and the accounts given of the richness of the grasses of these vast plains are not greatly exaggerated. Although certainly inferior to the pampas country of Argentina, the llanos are nevertheless capable of affording pasturage for vast numbers of live stock., Leonard V. Dalton, in his book "Venezuela," says concerning the possibilities of the live-stock industry:

> No visitor to Venezuela who penetrates far enough into the country to catch a glimpse of the llanos can fail to be impressed with the possibilities of the country in stock raising and exporting, and yet this great area of pasturage supports, in proportion to its extent, a mere handful of cattle and horses. The quality of the grass of the llanos may be inferior to that of the Argentine pampas, but even such a defect, if existent, may be improved in time, and so far (1912) no pedigreed stock have ever been introduced, nor has the industry ever been seriously handled.
>
> In 1804, according to Depons, there were 1,470,000 cattle, horses, and mules on the llanos, and by 1812 the number had increased to 4,500,000; but during the wars of independence, owing to the depredations of the opposing armies, the number was greatly decreased, and in 1839 was still only a little over 2,000,000. In the meantime, however, the excellent qualities of the Barquisimeto table-land and the Coro and Maracaibo lowlands for breeding goats had been discovered, and the export of goats' horns and hides has been continuously an important item in the trade of western Venezuela. In 1888 the number of head of stock on the llanos had increased to 8,500,000, and at that period many were exported to the other States and islands of America—a few even to the United States. Ten years later revolutions and counter-revolutions had decreased the number to 2,000,000.
>
> The establishment of the Venezuela Meat Products Syndicate works for shipping frozen meats from Puerto Cabello should do much to encourage an industry as yet in its infancy and yet of incalculable interest to the country, once properly developed.

Estimates of the total number of cattle in Venezuela at the present time vary from 3,000,000 to 9,000,000. It is probable that 3,500,000 would be a conservative estimate. Judging from the number of hides exported it seems probable that about 500,000 to 600,000 cattle are killed yearly. Thanks to existing high prices the stock-raising industry is at present prosperous. In 1915 it was stated that there were registered in the Republic 1,288 breeders with approximately $20,000,000 invested capital. The breeding of stock has begun to show slight improvements owing to the distribution of a better grade of stock. The slaughter of cows is prohibited by the Government.

AGRICULTURE.

The principal agricultural products of Venezuela are coffee, cacao, and sugar. The coffee trade of the Republic is normally very large, amounting in the year 1913 to 83,921 tons. Coffee was originally introduced into Venezuela near the close of the eighteenth century, and the northern hills and ranges are at present dotted with rich plantations. The best lands are located at an altitude of slightly more than 3,000 feet, although coffee grows readily in Venezuela at any altitude between 1,500 and 6,500 feet. The life of each coffee bush is said to be 50 years, and the quantity produced per tree is one-fourth to one-half pound annually. Exports of coffee for 1916 totaled $10,552,543.

The cacao of Venezuela is of a high quality and is produced in large quantities in the Maracaibo Lake, Caracas, and Orinoco Delta districts. The amount of cacao exported in 1916 was 15,183 metric tons, compared with 18,281 tons in 1915. The Republic in 1915 ranked seventh among the nations of the world as a producer of cacao and third among the Republics of South America.

The sugar industry of Venezuela is showing splendid progress and is attracting much attention from the outside world. Each year witnesses the construction of new mills, the installation of modern improvements, and the planting of additional acres under sugar cane. The climate of northern Venezuela is well suited for the growth of the cane, and the industry seems destined to develop very greatly in the future. Among the important companies in the field may be mentioned the Tacarigua Industrial Sugar Co. at Macaray, which has installed a mill capable of crushing nearly 1,800 tons of sugar daily; the Petare Sugar Co., with a 400-ton mill; the La Ceiba Sugar Co., at La Ceiba; the Venezuela Sugar Co., of Delaware, at Bobures; the Zulia Central Sugar Co., at El Banco; and the Unión Agrícola de Maracaibo. Most of these companies maintain their local offices at Maracaibo. Much of the sugar is used locally for distillation or for general purposes; some is exported, the export trade in the product being probably destined to increase considerably in the future.

Tobacco, cotton, maize, wheat, rubber, manioc, and other products are also raised. A small amount of the plantation rubber is exported, as is also an occasional shipment of manioc.

MANUFACTURING.

Despite the high import duties generally prevailing in Venezuela, manufacturing has made but little progress. There are several cotton mills in Valencia, their production, though of fair quality, being insufficient for the needs of the community. The tanning industry has made some progress, there being factories devoted to the manufacture of shoes, boots, and saddles. Matches are a Government monopoly, and their manufacture is carried on by a British company, the National Match Factory of Venezuela, capitalized at £219,967. Dividends have been usually 6 to 7 per cent per annum (see p. 528 of the Appendix for description of company's finances). Paper and glass, neither of the best quality, are manufactured, and there are a number of cigarette factories variously located. There are two important brewing companies in the Republic, the Cervecería Nacional, at Caracas, Valencia, and Puerto Cabello, and the Cervecería de Maracaibo. The approximate capitalization of the two companies is 2,500,000 bolivares and 1,700,000 bolivares, respectively. The Maracaibo company produced 321,195 gallons of beer in 1914 and 252,850 gallons in 1915. The Cervecería Nacional dates from the year 1894. Its original capitalization was 600.000 bolivares, the amount being increased to 2,500,000 bolivares in 1901.

Coal and electric power are both expensive, and it is believed that, following the completion of the petroleum refinery at Curaçao, considerable oil, produced locally, will be used for fuel.

FOREIGN CAPITAL IN VENEZUELA.

An estimate made in the year 1916 indicated that British investments in Venezuela amounted to approximately $39,905,300 United States currency. This included large holdings in Government external bonds, shares and debentures in four railways (the La Guaira-Caracas Railway, the Puerto Cabello-Valencia Railway, the Bolivar Railway, and the Central Railway of Venezuela), interests in public-utility enterprises at Caracas, the National Match Factory, certain petroleum undertakings, etc.

A very fair amount of American capital has found its way to Venezuela. The interests of the General Asphalt Co. are large, the Caribbean Petroleum Co. and other American interests are important factors in the oil development of the Republic, and there are sugar enterprises financed in the United States. American banks have recently entered the field. The location of the Republic geographically is favorable to closer financial intercourse with the United States.

German interests hold a number of Government bonds, control the Great Railway of Venezuela, running from Valencia to Caracas, etc.

France has from time to time controlled mining enterprises of more or less importance and has been interested in balata and rubber enterprises. The La Ceiba Railway, a local line of some importance, was constructed by French engineers, but whether any shares are held abroad is unknown.

The Royal Bank of Canada, a well-known Canadian institution, has recently opened a branch in Venezuela, while the Venezuelan-Canadian Ore Co. was a Halifax enterprise.

Part 2.—CENTRAL AMERICA.

BRITISH HONDURAS.

INTRODUCTION.

England's Central American colony, British Honduras, has an area of 8,598 square miles, and is bounded on the north and northwest by Mexico and on the west and south by Guatemala. The population of the colony is approximately 42,000, of whom about 13,500 reside in Belize, the capital. This city is the principal seaport and by far the most important center in the colony. A very large proportion of its population consists of negroes. Other important towns are Orange Walk, Stann Creek, Corozal, and Punta Gorda.

BONDED DEBT.

The total bonded debt of British Honduras, as of the year 1915, amounted to £194,735, as compared with £34,736 in 1905. Part of the proceeds of bond issues has been used for the construction of the Stann Creek Railway (see a later paragraph). The annual charges on the debt amount to £9,390, as compared with £2,175 in 1905. The total revenue for the colony in 1915 was £103,718, as compared with £63,742 in 1905.

The bond issues of the colony consist of (1) £9,000 4½ per cent bonds, dated 1888 and due 1918, repayable by means of a 2 per cent sinking fund, cumulative; (2) £20,000 4½ per cent debentures, dated 1894 and due 1923, the sinking fund being 2 per cent per annum, cumulative; (3) £160,000 4 per cent 10-year bonds, principal payable 1921 and convertible until 1920 into 4 per cent inscribed stock, maturing in 1971 and with a sinking fund of 1 per cent per annum. Interest on both bonds and inscribed stock is payable January 1. The loan is now represented by bonds £43,100 and inscribed stock £116,900. The bonds and inscribed stock are not actively quoted.

BANKING.

The banking facilities of the colony are provided by an agency of the Royal Bank of Canada. There would hardly be any opportunity for the location of an American bank there, although it may be noted that the United States normally buys more than three-quarters of the colony's exports and sells about one-half of what the colony buys.

RAILWAYS.

British Honduras possesses only one railway that may be called a common carrier. This is the Stann Creek Railway, 25 miles, running from the minor port of Stann Creek inland toward the foothills of the Cockscomb Mountains. The railway has erected a pier near the town, and a breakwater enables steamers to load and unload in safety. The cost of the line was approximately £173,000. Gross receipts for 1914–15 were approximately $28,200 and expenses $54,000. No further particulars are obtainable. The railway's limited freight traffic consists mostly of bananas and lumber.

In addition to the Stann Creek Railway, there is a small mileage of privately operated tramways to agricultural and timber properties. These lines are of little importance.

There have been projects from time to time for the construction of a line to extend across British Honduras and into the Peten district of Guatemala. This would open to the world some of the finest known tracts of hardwood forests, both in Guatemala and British Honduras. The construction of such a line would be fairly costly and would probably hardly warrant the investment, unless carried out by a company sufficiently supplied with capital to cut enough timber to develop a large proportion of the traffic. Doubtless this proposed line, through the construction of spurs and branches to reach various timber stands, would in time earn a substantial profit, but its business as a common carrier, for a time at least, would hardly prove remunerative. The possible construction of this line is further discussed in the chapter on Guatemala (p. 416).

PUBLIC UTILITIES.

The public-utility field is, of necessity, a very limited one, being confined for the present decade at least to such opportunities as may arise following the possible further growth and development of the town of Belize, which at the present time has but few modern improvements. At present its most important utility is a small electric plant, sufficient for its needs.

PRODUCTS OF THE COLONY.

British Honduras is primarily a producer of forest products. It contains fine forests of mahogany, rosewood, cedar, and other hardwoods, and is capable of supplying large quantities of chicle, rubber, cohune oil, mangrove bark for tanning purposes, logwood, etc. The logwood industry, once the most important in the colony, has been replaced by chicle gathering and hardwood cutting. Chicle exports in good years have exceeded 2,000,000 pounds, valued at more than $600,000. The rubber industry in the colony has not assumed importance, being confined primarily to the gathering of wild rubber from the forests. The logwood supply has diminished, owing, it is said, to the fact that the supply within easy reach of markets has been nearly exhausted. There is said to be an abundance of the logwood situated in more or less inaccessible places, which will doubtless be marketed at some future time.

As has been stated, a very large portion of British Honduras is under forest. The splendid mahogany trees of the colony have been marketed readily and their exploitation has attracted fair sums of foreign capital, partly American; 10,000,000 feet might be considered a fair annual yield and this production is likely, under normal conditions, to be maintained or exceeded for many years to come. The numerous rivers and creeks in the colony aid the lumbermen greatly, enabling them to transport the product at moderate costs. Much of the future in the mahogany industry will depend upon possible railways or short railway spurs connecting with the rivers and creeks. Other hardwoods, such as rosewood and cedar, are cut and exported, although not in as large quantities as the mahogany. Mangrove bark is exploited in a moderate way, there being considerable quantities of mangrove trees in the lower parts of the country and bordering the rivers and creeks. Pine is also found in large quantities, although it is probable that little could be done with it commercially.

Labor conditions in British Honduras are not bad nor are wages excessive, and the general field offers an opportunity to those provided with sufficient capital.

Bananas, plantains, and coconuts are exploited in British Honduras and the various planters in the colony are said, on the whole, to be prosperous. The United Fruit Co. has not taken up banana growing there, and the total annual exports of this fruit do not exceed $250,000. Coconut growing has been carried on with considerable success, and of late years some attention has been given to sugar-cane.

Little or no exploration work for minerals has been done in British Honduras. There are no mines of any description in actual operation.

One of the largest companies operating in British Honduras is the Belize Estate & Produce Co., a British corporation, capitalized at £70,000 stock (£60,000 paid up) and £30,000 debentures of 1920 and 1922. No statements of income are made public by the company, but dividend payments are generally at the rate of 10 per cent per annum.

COSTA RICA.

INTRODUCTION.

Costa Rica, ranking fourth in area and fifth in population among the Central American Republics, is one of the most progressive countries in the Americas. School attendance is compulsory, with the result that wideawake communities have been developed, especially in the mountain and plateau regions, which are the main centers of population, Most of the country is healthful to live in, and the excellent sanitary arrangements as well as the precautionary laws enforced by the authorities tend generally to better conditions.

The area of the country is 21,500 square miles (approximately; exact figures are not published), and the population as of December 31, 1915, was 430,700, compared with 334,300 in 1905 and 275,880 in 1895. The birth rate in 1915 was 44.5, and the death rate 22.

San Jose, the capital and largest city, has a population of 35,650. The city has tramways, electric lights, a splendid water supply, and every modern improvement. Other important cities of Costa Rica are Heredia (population 8,240), Port Limon (population 7,845), Alajuela (population 6,480), Punta Arenas (population 4,800), and Cartago (population 4,840).

BONDED DEBT.

The Republic of Costa Rica has outstanding two external loans, as follows:

(*a*) *Four to five per cent gold refunding bonds of 1911.*—These bonds were issued to the amount of £2,000,000 in 1911, largely to provide for the conversion of the external debt and the internal Port Limon sanitation bonds, the balance being used to provide funds for general purposes. The new bonds bear interest at the rate of 4 per cent per annum for the first 10 years from 1911, and at 5 per cent thereafter. A sinking fund commences operation in 1921. This sinking fund, which will amount to 1 per cent per annum, cumulative, will retire by January 1, 1958. The bonds are secured by a first charge on all the customs duties of the Republic, the proportion necessary to maintain the service to be paid over each month to the agent designated by the parties to the contract. No charge may be made on the customs duties in priority or equality to this issue.

The bonds described above were quoted on the London Stock Exchange in January, 1918, at 47, this comparing with the high price of 70¾ and the low price of 42 since 1911. The yield on the bonds if held until the final maturity date would considerably exceed 10 per cent per annum. It is stated that a portion (presumed to be £413,340) of the bonds are either owned by the Government or pledged as guaranties of credit.

(*b*) *External 5 per cent loan of 1911.*—In 1911 the Government of Costa Rica arranged for a loan of 35,000,000 francs with bankers of France, Germany, and the United States. This, the 5 per cent external gold loan, was contracted for at 80 per cent, the proceeds to be used to redeem the debt of the Pacific Railway of Costa Rica and a portion of the internal debt. The bonds are redeemable in 40 years from January 1, 1916, by means of a sinking fund and are secured by a first mortgage upon the revenues of the alcohol and liquor monopoly. The bankers purchasing this loan were given preferential right for a period of five years in any new financial operation of the Republic. No market quotation of this loan is available.

The principal internal bond issues of the Republic consist of a 1,200,000-colon 6 per cent loan of 1914–1925 and a 2,000,000-colon 10 per cent loan, floated in 1917. The Costa Rican debt, although fairly large, represents large expenditures for railways, sanitary improvements, local improvements, ports, etc. The European war seriously affected the revenues of the Government, but the service of the loans has been taken care of regularly and promptly.

None of the municipalities or Provinces have any funded debt, so far as can be ascertained. After the conclusion of the European war San Jose will probably arrange a bond issue to provide funds for local street improvements. The municipal slaughterhouse and its receipts, also certain public-utility revenues, are available as collateral. While a comparison of tax rates and conditions governing the levying of taxes in Latin America and the United States is impossible, it may be said that the taxpayer of San Jose does not pay to the municipality more than one-fourth of 1 per cent of the property valuation each year. In the event of this loan being negotiated, it is probable that most of the necessary supplies would be purchased in the United States.

BANKS.

At the present time banking facilities in Costa Rica are provided by three public banks (Bank of Costa Rica, Anglo-Costa Rican Bank, and Mercantile Bank), three private banks, and one agency of a foreign bank (Royal Bank of Canada). The last mentioned is highly successful. This branch of the Royal Bank of Canada is said to realize a substantial profit on loans to coffee estates secured by the crops. These loans pay from 6 to 9 per cent, and the creditor is amply protected, the laws governing these transactions being admirably suited to the situation.

In addition there was formed, following the outbreak of the war, a Government bank of issue, the International Bank of Costa Rica—an institution to have existence only during the European crisis. The shares of the three public banks named above are held locally, and the directors are Costa Ricans of high standing.

RAILWAYS.

The railways of the Republic consist of the Pacific Railway of Costa Rica and the Northern Railway of Costa Rica (with its leased line, the Costa Rica Railway). The first named, extending from

Puntarenas, on the Gulf of Nicoya (Pacific coast), via Alajuela, to San Jose (69 miles), is owned and operated by the Costa Rican Government. This railway handles a very fair amount of traffic, especially passenger traffic, but suffers from a lack of steamship tonnage calling at Puntarenas. Freight rates are reasonable, and the management is good. During 1913, 1914, and 1915 traffic handled was as follows:

Items.	1913	1914	1915
Freight handled ... metric tons [a]		76,654	67,959
Passengers carried ... number		232,841	208,043
Revenue	$347,700	$351,348	$318,264
Expenses	$377,476	$331,261	$278,397
Net profit	[b] $29,776	$20,087	$39,867

[a] Metric ton=2,204.6 pounds. [b] Deficit.

Expenses as shown above include expenditures made for improvement purposes and permanent betterments. The Government estimated that the revenues from the railway in 1916 would amount to $359,200. Increased passenger traffic has led to the putting into service of additional trains.

The Northern Railway publishes no statement of earnings, it being directly owned by the United Fruit Co. This railway transported 35,921 passengers in 1915 (39,195 in 1914), as compared with 535,396 passengers carried by the Costa Rica Railway (583,918 in 1914). Local freight, exclusive of bananas, amounted to 9,445 metric tons in 1915 (17,160 tons in 1914). A fair amount of timber was also handled.

The total number of passengers carried by the Costa Rican railways in the year 1915 was 779,360, as compared with 855.954 in the year 1914. The total railway mileage in operation throughout Costa Rica, as of December 31, 1915, did not exceed 450 miles. Recent construction work has been confined to the various United Fruit Co. lines, which extensions are built solely to meet the requirements of the banana trade.

The Republic needs additional railway mileage, particularly in the States of Guanacaste and Alajuela. The possibilities of a new line have been brought to the attention of the writer. This railway would start at Puntarenas and strike northward through Guanacaste toward the Nicaraguan frontier. Connections could readily be afforded with Lake Nicaragua, and later with the Pan American line through Central America. The railway as represented to the writer would strike across the mountains, thence eastward through the little-developed northern section of the Republic, to reach eventually the United Fruit Co.'s lines in Limon. The cost of this railway would not exceed $25,000 per mile, it is stated, and the proposed line would throw open the rich mining territory of Guanacaste and would make available for settlement and development the fine northern districts of the Republic, said to contain large amounts of hardwood and other timbers and extensive agricultural and banana areas. The bananas would find a market through the United Fruit Co. The Nicaragua connection would, it is stated, bring a fair amount of cattle traffic to the railway.

Whether such a railway would pay is problematical and would depend largely upon how the undertaking was carried out. A large portion of the country traversed would be virgin wilderness, which, however, contains sufficient wealth to assure a large amount of traffic, once developed. Construction difficulties are said to be not great. If worked by a company having sufficient capital to cut the timber, work the mineral areas, and generally explore and develop the country. this undertaking would be likely to prosper.

Including the Costa Rica Railway, the Northern Railway of Costa Rica, etc., the total railway mileage of the United Fruit Co. in Costa Rica, as of September 30, 1917, was 330, and the tramway mileage 230. Fifty-three locomotives and 949 cars were in service, and 534 additional cars were used on the tramways. The total investment of the United Fruit Co. in railway lines in Costa Rica amounted to $2,840,268 and in tramways to $204,479.

COSTA RICA RAILWAY.

The Costa Rica Railway was originally incorporated in 1886, to take over then existing lines in Costa Rica and to construct additional mileage. At the time of the incorporation of the company the lines were being operated by Mr. Minor C. Keith under lease from the Government, and this new arrangement was made on behalf of the holders of the external Government bonds of the Republic. The Government transferred its railways for a period of 99 years from the completion of the new lines, and conveyed to the company 800,000 acres of land in consideration of the allotment to the Government of one-third and to the bondholders of two-thirds of the company's share capital. Such of the lands as were unsold or had not been utilized in 1904 reverted to the Government. All rolling stock and supplies for construction purposes may be entered customs free.

Under date of July 1, 1905, the United Fruit Co. entered into an agreement to work the line until within two months of the final date of the lease, transferring its operation to a subsidiary, the Northern Railway of Costa Rica. The Northern Railway was to pay an annual rental for the property, this rental amounting at present to £149,100 per annum. This is the maximum amount payable, unless additional debentures up to £20,000 are issued.

The Costa Rica Railway has outstanding £1,800,000 stock, on which dividends of 2 per cent per annum have been paid during recent years. The debenture issues consist of the following:

(1) £200,000 prior mortgage 5 per cent repayable prior to 1933, through the operations of a sinking fund. Approximately £130,000 of these debentures remain outstanding.

(2) £180,000 prior mortgage debentures (second series) bearing interest at 5 per cent per annum, March and September 1 (similar date for first series), the principal being repayable by sinking fund on or before 1941. Approximately £150,000 of these debentures remain outstanding.

(3) £655,000 first mortgage 6½ per cent debentures, issued September 1, 1916, to extend maturing 6 per cent first mortgage debentures. All of these debentures remain outstanding. A cumulative sinking fund of £3,000 per annum commenced operation July 1, 1917, this sum to be used to purchase these debentures and second-mortgage

debentures (see following). The company may not pay a dividend on its stock in excess of the present rate, 2 per cent, until the sinking fund shall be equal to one-half of the first-mortgage and second-mortgage debentures for the time being outstanding. The company reserves the right to retire the debentures at 103 and interest until September, 1921; at 102 from September, 1921, until September, 1926; and thereafter at par.

(4) £600,000 6½ per cent second debentures, all outstanding, interest 6 per cent fixed and ½ per cent dependent on income (see first-mortgage debentures, above).

All the above securities are listed on the London Stock Exchange. Recent quotations have been as follows:

Securities.	High price since 1911.	Price January, 1918.
Ordinary stock	50	25
5 per cent prior mortgage debentures	103	90
5 per cent prior debentures (second series)	103	90
6½ per cent first-mortgage debentures	[a] 105	96
6½ per cent second-mortgage debentures	[a] 103	92

[a] These were the high prices for the 6 per cent debentures due 1916.

PUBLIC UTILITIES.

San Jose has a good water and drainage system, and telephone service is maintained there and in various other parts of the Republic. As of December 31, 1915, 34 cities and towns had electric-lighting facilities and 88 cities, towns, and villages had water supply. The water-power facilities are good and sufficient for the country's needs.

There is one tramway system in the Republic, namely, that operated by the Costa Rican Electric Light & Tramways Co. This is a British concern, its securities being quoted on the London Stock Exchange. In 1915, 1,809,823 passengers were carried. The line traverses the city and suburbs of San Jose and operates extensions to San Pedro del Mojon and Guadelupe. It is stated that this company and other public-utility properties in and about San Jose were to have been acquired by New York interests, but this transfer of control has been abandoned for the time being, at least.

The company's balance sheet as of June 30, 1917, stated that the capitalization consisted of £130,000 ordinary shares, par £1, £187,750 5 per cent first debentures (original issue £197,150, £9,400 having been redeemed through sinking fund) and £98,900 prior lien 6 per cent debentures (original issue £100,000, balance retired through sinking-fund operations).

The net earnings of the company, after charging all expenses incurred, amounted to £14,381 in 1916–17, as compared with £19,211 in 1915–16. The final result after payment of all charges was a net deficit of £3,827. The disappointing results, it was stated, were due largely to the rise in the rate of exchange, business having been well maintained, despite the general dislocation in trade on account of the war.

The sinking fund on the debentures of the Costa Rican Electric Light & Tramways Co. was suspended in 1915 until the May 1 following the conclusion of the European war. The 5 per cent debentures were originally issued mostly at 90; they were quoted at 60 in January, 1918. The 6 per cent prior debentures sold at 91 shortly before the outbreak of the European war. They are not actively quoted. The tramway line is 10 miles in length. In 1956 it reverts to the municipality without payment. The electric-lighting plant and undertaking is to remain the property of the company in perpetuity.

A company, also British, known as the Costa Rica Markets Co., and formerly called the Costa Rica Markets & Tramway Co., formerly held a concession to operate a tramway system in the city of Cartago. This tramway undertaking was abandoned in 1898, but the company continues to operate markets both in Cartago and Heredia. The market concessions are for 50 years from 1888, at the conclusion of which period they revert to the municipality. The capitalization of this company, authorized and outstanding, consists of £60,000 in shares of £10 each, including £10,000 issued in 1900 to holders of first mortgage bonds, in satisfaction for overdue interest. There are also £44,800 (approximately) 4 per cent (formerly 7 per cent) first mortgage debentures, redeemable at par or under after surplus after bond interest; £9,700 5 per cent second mortgage debentures due 1916 (presumably extended); and £8,400 (original issue £10,000) prior lien 7 per cent debentures. The reduction in the interest rate followed the abandonment of the Cartago tramway, after the earthquake of 1898, and the 4 per cent has been maintained, though with some recent irregularity, on the first mortgage bonds. Interest on the second mortgage bonds was defaulted in 1895 and largely remains unpaid. The interest on the prior lien bonds has been paid regularly and the sinking fund maintained. Profits from the markets have varied during recent years from £1,895 in 1914–15 to £3,022 in 1913–14. There was a debit balance to profit and loss, inclusive of unpaid interest, on September 15, 1915, of £22,465. First mortgage debentures carry voting power, 10 votes to each £100.

AGRICULTURE.

The coffee plantation is the one factor around which the economic development of the Republic is built. The size and value of the coffee crop means relatively as much to Costa Rica as does the grain crop to Argentina or Russia, and has much to do with the price and stability of the exchange market. The value of coffee exported in 1914 and 1915 was $4,666,368 and $3,732,713, respectively. The coffee is of a very high grade. Formerly the United States purchased only a very small amount, but since the war it has taken ever-increasing quantities. The average return on investments in coffee estates covering a period of years is quite large, provided, of course, the management is good.

Banana raising as a field for the investment of capital is not generally recommended, for unless the business is handled on a very large scale and the company has other branches of enterprise there is little likelihood of profits being earned. While the production of bananas in Costa Rica does not directly benefit the country greatly other than through the revenues derived from the export duty, it nevertheless brings a fleet of excellent ships to Port Limon, carrying large numbers of tourists who spend very substantial sums of money in the country annually.

The cultivation of cacao is increasing and will no doubt in time prove of great importance, especially in the blighted banana lands adjacent to the Northern Railway of Costa Rica.

Costa Rica is coming into prominence as a sugar country, especially the western and central Provinces. Formerly the country imported sugar, but now is exporting it in considerable quantities. The output in 1915 was 5,207 metric tons, as compared with 2,869 tons in 1913. Of the sugar raised during the year, 2,392 tons, valued at $165,620, were exported, of which the United States and Panama took by far the greater portion. There seems no reason why sugar planting on a large scale in this country should not be profitable, as labor is reasonable—far cheaper than in Cuba—and markets are accessible.

The United Fruit Co. is by far the largest and most important concern that has invested in Costa Rica. As of September 30, 1917, that company stated the book cost of its properties in the Republic to be $12,851,897, a sum larger than that invested in any other of the tropical countries. Lands owned were carried at a book value of $6,855,863, houses and buildings at $738,073, railways at $2,840,268, cultivations at $1,148,627, etc. The acreage improved and unimproved was as follows: Improved, 38,196 owned and 921 leased; unimproved, 202,304 owned and 4,360 leased; total, 240,500 owned and 5,281 leased. The 39,117 acres under cultivation were devoted to the following crops: 24,914 to bananas, 7,495 to cacao, 652 to coconuts, and 107 to pineapples, the remainder being mostly used for pasturage. A total of 2,737 cattle and 1,650 other animals were owned.

MINING ENTERPRISES.

The mineral resources of the Pacific slope of Costa Rica are very large. Gold has been mined at intervals since before the Spanish conquest. The value of gold exported in 1915 was $800,294. A small amount of silver (value $6,122) was also exported. Recently a large manganese field was discovered and numerous claims have been located. This ore body is rather remote from transportation facilities. It is of blanket formation. Many other minerals are known to exist, but development awaits the coming of additional railways.

The Costa Rican Manganese & Mining Co., of Delaware, is planning to carry on extensive mining operations in this field.

Oil has recently been discovered in Costa Rica, apparently in paying quantities. A concession to explore the oil-bearing lands, which are located in San Jose, Guanacaste, and Alajuela, was recently given to an American syndicate (the Sinclair Gulf Corporation). A subsidiary company will be formed to exploit fully the possibilities of the field.

The principal mineral is gold and the principal mining fields are those of Abangarez, La Union, Aguacate, and Montezuma.

The Abangarez Gold Fields of Costa Rica was incorporated in 1899 and acquired various mining properties in the Republic, including those of the Guanacaste Syndicate, the Guacimal Exploration Co., and the Costa Rica Esperanza Mining Co. A power plant on the Guacimal River, a mill, an aerial tramway, etc., are owned.

As of May 1, 1915, the company, which is largely controlled by interests identified with the United Fruit Co., entered into an agreement with Mr. J. N. Popham by which the latter undertook to operate the property on a basis of 10 per cent of the net profits over and above operating expenses and the cost of current development work necessary to open up new ore reserves.

The capitalization of the company as of December 31, 1916, consisted of $3,880,000 common stock, $1,000,000 preferred stock, 6 per cent cumulative, and two issues of 6 per cent notes, $374,000 and $476,000, respectively, which matured May 1, 1916, and the principal of which had not been paid off to August, 1917. The par value of the shares is $25. About 42 per cent in back dividends on the preferred stock remains due and unpaid.

The earnings of the company over a period of years have been as follows:

Years.	Gross revenues.	Net income after interest charges.	Tons of ore crushed and milled.
1910	$805,234	+$267,047	31,317
1911	982,586	+ 188,552	42,514
1912	606,782	− 175,463	50,011
1913	579,236	− 22,040	69,346
1914	198,887	− 174,589	37,742
1915	197,619	− 87,789	25,262
1916	670,574	+ 165,389	50,221

The company had, as of December 31, 1916, $282,519 cash and other current assets. There were $1,333,426 notes, including those overdue and unpaid, and current liabilities to the amount of $158,063. It is stated that during the early months of 1917 the outstanding demand loans have been reduced by $158,000. A total of $98,432 was expended during 1916 for betterments and underground development. Future prospects were said to show promise.

The Montezuma mine is under American management and control. It is said to be showing good profits. The mine was discovered before the arrival of Europeans in Costa Rica.

Although copper is not mined at present in Costa Rica in commercial quantities, it is known to exist, probably in sufficiently large veins to warrant exploitation. The Las Concavas mine, opened centuries ago, was a moderate producer for a considerable period, but at last accounts was idle. Various other outcrops of the ore have been located, and some were mined in a small way before the Spanish conquest.

MANUFACTURING.

Costa Rica is not a manufacturing country of importance. Coffee-drying establishments, small sugar mills, a liquor distillery (national), and a few tobacco factories are most worthy of notice. There are in addition 8 ice factories, 1 brewery, 29 iron foundries and shops, and 62 steam sawmills. There are in all 4,678 manufacturing and commercial establishments. Of these, 2,692 are under Costa Rican control, 518 owned by Chinese, 438 by Spanish subjects, 254 by subjects of the British Empire, 168 by Italians, and 105 by citizens of the United States. There are doubtless numerous opportunities in this field, especially as the country is certain to attract immigration in the not distant future. These opportunities are, however, confined for the present to industrial enterprises not requiring extensive capital.

FOREIGN INVESTMENTS IN COSTA RICA.

Taken as a whole, Costa Rica might be spoken of as an attractive field for investment. The country, away from the railways, is little developed and in many parts is wonderfully fertile. Great Britain and the United States have the largest investments at stake, Great Britain holding approximately $8,000,000 Government bonds, as well as shares and debentures of the Costa Rica Railway, the Costa Rica Electric Light & Tramway Co., Costa Rica Markets, etc. The United States has invested in the field a sum probably about equal to that which Great Britain has placed there. The principal American concern is, of course, the United Fruit Co. There is also considerable American capital in mining and other enterprises. Probably our interests have $20,000,000 at stake in the Republic. France owns about $7,000,000 bonds and presumably has some minor investments. Germany is thought to possess about $1,500,000 of the Government bonds and has placed sums in the coffee industry. Canada has its banking agency. Presumably most of the other capital has been raised locally.

There are few countries in the Americas more advanced and progressive than Costa Rica, and once it is able to obtain additional immigration and more capital for development its future is assured.

GUATEMALA.

INTRODUCTION.

Guatemala, the most northerly of the Central American Republics, is second in area and first in the number of inhabitants among the countries of Central America. Its estimated area is 46,774 square miles and its population, according to a recent estimate, 2,119,165. The Republic borders on the Pacific Ocean, the Caribbean Sea, Mexico, Honduras, Salvador, and British Honduras. Its total coast line is 283 miles, and it has three ports of commercial importance, Puerto Barrios and Livingston, on the Caribbean Sea, and San Jose, on the Pacific Ocean. A large portion of the country, particularly the central and western part, are extremely mountainous, a number of the peaks being volcanic. The climate varies from the tropical heat of the coastal lands to the cool, bracing air of the interior highlands. The rainfall, extremely heavy on the coast, lessens as the interior is reached, averaging less than 33 inches per annum at Guatemala City.

As a field for investment, Guatemala has attracted a fair amount of foreign capital. The Guatemalan Government stated in 1915 that more than 50,000,000 marks of German capital had been invested in coffee plantations, public utilities, banking institutions, etc., while British investments in Government bonds, railway securities, coffee plantations, etc., amounted to possibly $25,000,000 to $30,000,000. The principal American investments are held by or in the interest of the United Fruit Co., the total investments of which were stated to amount to $4,751,288 as of December 31, 1916. Most of the common stock and a portion of the other securities of the International Railways of Central America are also held by interests identified with the United Fruit Co. The total American capital invested probably amounts to $12,000,000.

The capital and chief city of the Republic is Guatemala City, its population numbering probably 115,000 to 120,000. There are several other more or less important cities, among them Coban, Escuintla, Mazatenango, and Quezaltenango. A large part of the population of these cities and of the country away from the Caribbean coast is partly or wholly Indian.

GOVERNMENT LOANS AND FINANCES.

The external debt of Guatemala amounted, at last accounts, to £1,468,060. This represents the outstanding balance of £1,600,000 bonds issued in 1895 to unify the external and internal debts of the Republic, amounting at that time to £890,300 and £964,144, respectively. The rate of conversion was £75 of the new bonds for £80 old external bonds and £75 of the new bonds for £100 old internal bonds, with coupons in arrears. A noncumulative sinking fund of £15,000 per annum was to retire the issue, gradually, and an export tax on coffee was assigned as security for the bonds. The present rate of tax on coffee is $1.50 gold per quintal.

For a period of years the Republic experienced difficulty in making payments of interest on the bonds, but since 1913 payments have been made regularly, despite the falling off in governmental income owing to the war's effects on the customs duties. The financial position and credit of the Republic have shown considerable improvement. The sinking-fund operations are expected to be resumed commencing July, 1917, and deferred certificates will, it is expected, be issued to cover all interest payments in arrears. The methods that will be followed in paying off these deferred certificates had not been announced at the time this report was written. Guatemala has made a very creditable showing in handling its finances, and in meeting the service on its external loans has usually advanced the necessary funds to its representatives abroad two or three months before the date on which due, thus assuring prompt payment.

A recent statement placed the internal debt of Guatemala at £186,929. This was largely in the form of contracts due the various banks, including approximately 45,000,000 paper pesos due the Banco de Guatemala and approximately 30,000,000 paper pesos due the Banco de Occidente. Internal bonds outstanding amounted to 3,667,000 paper pesos and interest on bonds in circulation amounted to 7,154,053 paper pesos. The remainder of the internal debt was in the form of obligations due the railways, notes of the bankers' committee, floating debt, etc. Gold liabilities were in the form of $343.178 "Sundry Departments of State," and $584,802 due the Central Railway (International Railways of Central America).

The general estimates of administrative expenditures during the fiscal year July 1, 1917, to June 30, 1918, were 64,780,957 paper pesos, as compared with total expenditures during 1916 amounting to 51,897,633 paper pesos. The principal items in the budget for 1917–18 were: Public credit, 23,139,138 paper pesos; War Department, 10,310,708 pesos; Education, 7,704,370 pesos; Interior and Justice, 7,048,867 pesos; Finance, 4,770,792 pesos; and Foreign Affairs, 3,845,346 pesos.

The highest recorded price since 1911 on the London Stock Exchange for the Guatemala external 4 per cent bonds was 59½, this comparing with an approximate price of 42 in January, 1918.

BANKS.

There are several banks of importance in Guatemala; these will be discussed briefly:

The American Bank of Guatemala dates from the year 1895, when it was founded with a capitalization of 1,000,000 silver pesos (1 silver peso equal to $0.363 United States gold), the shares having a par value of $1,000 each. Since its incorporation the American Bank has increased its capitalization from time to time; the present total is 4,000,000 silver pesos, all of the increased capital being issued at a substantial premium. The 4,000 shares are held by more than 400 persons and firms, the average holding being between 5 and 20 shares; the largest shareholder is the Colombian Bank, with 132 shares in its possession. The reserve funds of the bank are about equal to its capitalization. The annual dividend rate is very large, frequently reaching 40 per cent. The bank is located at Guatemala City.

The Bank of Guatemala was founded early in 1905 by a group of Guatemalan and foreign capitalists and received from the Government valuable concessions and exemption from taxes. The authorized capitalization of the bank is 10,000,000 silver pesos, of which 2,500,000 pesos stock is outstanding. The par value of the shares is 1,000 silver pesos each. Not long after the bank began operations the shares were quoted at a premium of 50 per cent, from which point they soon rose to more than twice par. The bank has a reserve and sinking fund equal to more than twice its capitalization. It collects the funds derived from the import tax on general merchandise and the export tax on coffee and other products, such as timber, etc. Among its founders was Gen. Barrios, then President of the Republic. The head office of the bank is at Guatemala City; there is a branch at Escuintla, and there are agencies throughout the Republic.

The Occidental (Western) Bank was founded in 1881 and has its headquarters at Quezaltenango. Its authorized capitalization is 2,000,000 silver pesos, of which approximately 1,650,000 silver pesos is paid in. The bank occupies a strong position, having substantial reserves on hand. In addition to its main office, there is a branch at Guatemala City and agencies at Retalhuleu, San Felipe, Mazatenango, and Cotapeque.

The Colombian Bank was founded in 1878 with Colombian capital and by Colombian citizens. The institution holds a small interest in the shares of the American Bank of Guatemala. The head office is at Guatemala City.

The International Bank of Guatemala is the oldest institution of its kind in the Republic, having been founded in 1877. Its paid-up capitalization is 2,000,000 silver pesos.

RAILWAYS.

The only important railway system in Guatemala is that operated by the International Railways of Central America, incorporated in 1912 as a consolidation of the Guatemala Central Railway, the Guatemala Railway, the Occidental Railway and the Ocos Railway. The company's lines as they now exist extend from Puerto Barrios, the most important Caribbean port of the Republic, to Guatemala City (194 miles), thence to San Jose on the Pacific Ocean (74 miles), with a branch from Santa Maria, through extensive coffee districts, to Mazatenango (60 miles) and thence to the Pacific port of Champerico (42 miles). An extension also runs from Las Cruces to the Mexican frontier (54 miles), and additional mileage is in operation in the Republic of Salvador (see p. 446).

The section of the system extending from Puerto Barrios to Guatemala City was projected a number of years ago by the late Rufino Barrios, then President of the Republic. Work on the undertaking was begun in 1892, and by the end of 1894 the line had been constructed from the coast to El Rancho, 129 miles. At this point the Government, owing to lack of funds, was compelled to suspend construction and the property was leased to a private company. Business did not come up to expectations, and the company, in order to meet operating expenses, had to run the road without making any charges for maintenance expenses. The result was that the entire line was allowed to fall into a deplorable state of disrepair, causing the operation of trains to be practically suspended. A slow passenger-and-mail train was run about once a week in each direction, provided the track was not partly washed away or bridges down. In the year 1902 plans were laid to reconstruct the line and to continue it to Guatemala City. The building of the new mileage required some heavy engineering, the country traversed being extremely mountainous. This section of the line abounds in wide curves, cuts, and fills, and there are a number of tunnels. The first train was run from the Caribbean coast to the capital in 1908.

The International Railways of Central America is now operated in four divisions, as follows:

Divisions.	Mileage.	Gross earnings.		Operating expenses.	
		1915	1916	1915	1916
Atlantic Division	195	$1,293,314	$1,446,151	$607,038	$589,469
Central Division	139	742,369	981,115	470,776	450,863
Ocos Division	12	44,373	9,188	36,061	27,755
Salvador Division	99	123,882	139,166	112,288	117,732
Total	445	2,203,938	2,575,620	1,226,163	1,185,819

In 1915 the net revenues from operations were $977,775; the total net income after taxes had been deducted and other income added (operating income) was $1,013,140; interest, discount, etc., amounted to $596,471; and the net income (surplus) was $416,669.

In 1916 the net revenues from operations were $1,389,801; the total net income after taxes had been deducted and other income added (operating income) was $1,418,913; interest, discount, etc., amounted to $587,700; and the net income (surplus) was $831,213.

Including the operations of the Occidental Railway (50 miles) and the Pan American Extension from Las Cruces (41 miles), gross receipts in 1916 totaled $2,825,295 and in 1915 $2,406,087.

The total mileage completed by the International Railways of Central America, as of December 31, 1916, was 592, as compared with 588 miles as of December 31, 1915; the mileage under construction at the beginning of 1917 was 31; and the mileage still to be built was 277. The unconstructed mileage is to be located 55 miles in Guatemala, 134 miles in Salvador, and 88 miles in Honduras.

The total capitalization of the company consists of $30,000,000 common stock, $10,000,000 5 per cent preferred stock, and $10,506,666 bonds. The preferred stock is cumulative and received dividends at the rate of 5 per cent per annum from August, 1912, to August, 1915, inclusive. In the event of the common stock receiving more than 5 per cent in any year, the preferred stock is entitled to a similar dividend. No dividends have as yet been paid on the common stock. The bond issues consist of $2,379,000 6 per cent bonds of the Guatemala Central Railway (due 1931), £1,000,000 first mortgage 5 per cent (due 1972), and $3,621,000 secured by a first mortgage on 104 miles and by a second mortgage on the remainder of the mileage.

The Southern Pacific Co. owns $1,788,000 of the Guatemala Central 6 per cent bonds.

Quotations for the company's securities follow:

Securities.	High price since issue.	Price January, 1918.
Common stock	23	10
Preferred stock	72	51
First mortgage 5 per cent bonds	87	70

The stocks of the company are listed on the London Stock Exchange and in New Orleans.

It is presumed that eventually the system will be carried through Nicaragua, Costa Rica, and Panama, giving an all-rail route between the United States, Mexico, Guatemala, Salvador, Honduras, Nicaragua, Costa Rica, Panama, and the Canal Zone.

The International Railways of Central America owned, as of December 31, 1916, 7,500 shares of the common stock and 190 shares of the preferred stock of the Guatemala Tramway, Light & Power Co., the shares being carried at a cost valuation of $14,000. As of the same date the railway company had advanced to the public-utility company $231,166. In addition, the railway company owned, as of the above-mentioned date, $77,160 shares of the Guatemala Marble & Granite Co.

The United Fruit Co., as of September 30, 1917, operated 92 miles of railway in the Republic of Guatemala, as compared with 52 miles operated in 1915. The company also operated 147 miles of tramways, as compared with 151 miles in 1915. Locomotives in service were 10 in number, and 35 cars were in use on the railways and 370 on the tramways. The cost of railway lines in Guatemala owned by the United Fruit Co., as of September 30, 1916, totaled $1,007,778 and of tramways $237,512. While these lines are built primarily to handle the banana trade of the company, they nevertheless do a limited business as common carriers.

Guatemala is a rich country, and further development along railway lines is sure to take place in the not distant future. A line is destined at some future date to enter the Department of Peten, running from British Honduras. This line will have its Guatemalan terminus at Flores, on Lake San Andres de Peten, and will extend through the finest hardwood district in Central America. It will cross the boundary at Carbutts Falls and will reach the Caribbean Sea at the port of Belize. Peten is the largest in area among the Departments of Guatemala, despite which fact its population is the smallest, not exceeding (at most) 8,000.

The Verapaz Railway is a 29-mile line, extending from Panzos to Panacajche, and was completed in the year 1898. Panzos is a city on the banks of the River Polochic, and is in steamship communication with the port of Livingston, on the Caribbean Sea (weekly service is maintained). The railway is an outlet for a large section of the important Department of Alta Verapaz, which produces coffee in large quantities, as well as cacao, sarsaparilla, vanilla, cotton, etc. This section of the Republic is rich also in all classes of lumber and, in the years before the European war, exported large quantities of valuable orchids and rare plants.

The present railway mileage of Guatemala is approximately 575, not including the tramways operated by the United Fruit Co., the Urban (horse) Railway, and light railways to coffee plantations.

PUBLIC UTILITIES.

Public-utility development in Guatemala has made moderate progress. The cities, except Guatemala City, are comparatively small and consequently their needs are more or less limited. The capital is the only city possessing tramways or likely to develop sufficient traffic to support them. The system in Guatemala City is operated by mule service, although plans have been laid to modernize the line by electrifying it. During 1915 the Urban Street Railway of Guatemala City carried 2,984,950 passengers; 9.24 miles of lines are operated. There is also an interurban system operated by steam.

The International Railways of Central America owns 7,500 common and 190 preferred shares of the Guatemala Tramway, Light & Power Co., carried at a valuation of $14,000. The railway company has advanced to the public-utility company the sum of $231,166.

German capital is invested in the electric lighting system of Guatemala City.

Guatemala City receives its water supply from the aqueducts of Pinula and Mixco and the Rivers Acatan and Minas. The aqueduct of Pinula runs north and south, a distance of about 6 miles, and is well constructed; the water from Mixco is brought to the city by means of a masonry conduit about 9 miles in length, and it runs through two hills by means of tunnels. The daily capacity of these two sources of supply is about 1,325,000 gallons. The River Acatan has its source to the southwest of the city and its supply is somewhat more than one-half of that furnished by Pinula and Mixco. The water from the Minas River is obtained by means of a 15-mile pipe line, the construction of which was financed by the International Bank of Guatemala, the supply amounting to about 600,000 gallons daily.

The water supply of the city remains insufficient, despite the efforts made to increase it, and plans have been considered for the laying out of a new and comprehensive system to cost $1,500,000 or more. The source of this supply would probably be the River Teocinte, and the distance required to carry the water to the city would be about 20 miles. Some engineering difficulties would be encountered. Plans have also been considered for the laying out of a new and enlarged sewerage system for the city, the estimated cost of this undertaking to be approximately $1,000,000.

Other cities and towns in Guatemala have water-supply systems and there are electric lighting plants and services in San Jose, Momestenango (population said to be 25,000), Huehuetenango (the Huehuetenango Electric Co.), Quezaltenango, Totonicapan (municipally owned service inaugurated in 1911), San Marcos (population 5,000), Puerto Barrios, and several other towns and cities. There are also telegraph and telephone services, the latter in operation in

Guatemala City and in a number of smaller cities and towns. The telephone systems were constructed as private enterprises, while the telegraph lines are mostly under State control. Upward of 1,000,000 private telegrams are handled annually.

MINING ENTERPRISES.

Guatemala possesses a considerable amount of mineral wealth, despite which fact, however, but little actual mining is being carried on. The extremely rugged nature of the country and the lack of railways and roads account for this lack of development.

There were small copper mines in Guatemala during the colonial period, and work was carried on at as early a date as the seventeenth century. Small copper veins have been located in the western part of the Department of Baja Verapaz, near the towns of Rabinal and Cubulco. This is about in the center of the Republic. In the Department of Chiquimula, near the boundary with Honduras and Salvador, have been located copper deposits said to average from 5 to 20 per cent copper. These deposits are not worked, but will be available in the event of the construction of the projected and partly surveyed railway to extend from Zacapa, on the main line of the International Railways of Central America, to Santa Ana, Salvador. Other copper deposits are known to exist in this now isolated Department. In the Department of Huehuetenango, on the northwestern frontier, copper has also been located. The find was made near Chiantla, where there are also silver-lead mines. Chiantla is located just north of Huehuetenango, the capital of the Department. No railway lines are near at hand, and communication with the outside world is somewhat difficult. In this Department silver-lead mining has been carried on since the early colonial period, although at the present time operations are on a very small scale.

Approximately 70 years ago a company controlled in England and France acquired rich mining properties in the Department of Chiquimula and carried out extensive operations, obtaining nearly 50,000,000 ounces of silver, before the supply of the marketable grade of the mineral was exhausted. During the period of its greatest prosperity, the mine is said to have been the greatest silver producer in Central America. This distinction is held at present by the New York & Honduras Rosario Mining Co., of Honduras.

A considerable amount of placer gold mining is being carried on, mostly by individuals. The largest and most important gold placer property is the "Las Quebradas Gold Mines," situated some 30 miles from Puerto Barrios, on the Caribbean coast. The mines are located on the Bobos River, in the foothills of the Merendon Mountains, at an altitude of about 700 feet. The near-by town of Las Quebradas consists almost wholly of the workpeople and their families, having a population of about 250. The property is about 8 miles from Morales, on the Puerto Barrios-Guatemala City section of the International Railways of Central America, and is practically connected by a spur of one of the United Fruit Co.'s banana lines. The area of this property is about 2,000 acres, and the charter is in perpetuity. The average return per cubic meter varies from 25 to 50 cents. Excellent water power is obtainable from the falls of the Bobos River, three miles above the mining property. For a long time the mines were the property of an American firm, Potts & Knight, but it is understood that negotiations were under way a short time ago whereby a syndicate would take over the property and develop it on an even more extensive scale than hitherto.

The total number of mines that have been declared or registered is approximately 135. Of this total probably not more than half a dozen are worked. The mining laws of the Republic are extremely liberal, a concession being necessary only in the event that machinery is to be installed. A mining claim covers approximately 25 acres of surface and allows the holder to mine as far beneath the surface as desired.

There are evidences that a substantial amount of petroleum exists in the Republic. The Government has decreed itself in exclusive control of the oil deposits, although privileges will be granted whereby private interests will be able to lease oil lands over a term of years.

OPPORTUNITIES IN THE DEPARTMENT OF PETEN.

The Department of Peten, which comprises the most northerly section of Guatemala, has an area of about 39,500 square kilometers (15,250 square miles), equal to about one-third the total area of the Republic. Its population hardly exceeds 8,000 and it has not been wholly explored. The Department is known to be one of the greatest sources of undeveloped forest wealth in Central America. In the north of the Department are vast areas of campeche, a very valuable dyewood, the existing supply being almost unlimited. Its exploitation, which has thus far been hardly attempted, will some day prove a source of great revenue to those willing to undergo the hardships inevitable in such a district. In this section of Peten there also exist a very large number of "chicozapote" trees, from whose sap the chicle of commerce is made. These trees grow to a large size and form dense forests, facilitating their exploitation. A considerable amount of this gum is extracted annually, but the supply is still far from being exhausted.

Henequen, to-day the chief source of wealth of the Yucatan section of Mexico, is destined in the not distant future to be cultivated and produced in very large quantities in this section. Practically no henequen is being exported from Peten at the present time. The profile of the northern district is generally level and in some sections swampy. The climate is generally more or less torrid and in some parts rather unhealthful.

The eastern section of Peten, bounded by British Honduras, is extremely rich in forest products—mahogany, cedar, caracolillo (a tree similar to mahogany), a wide variety of cabinet woods, rubber, chicle, sarsaparilla, and numerous dye, tanning, and medicinal trees. The climate in this district is torrid, the rainfall heavy, and the population sparse. It is through this section that a railway starting from Belize, British Honduras, is likely some day to find its way. It has been pointed out that this railway would develop in the course of time a very large traffic in forest products and would prove the eventual means of developing the Department.

The Meridional Region, or mountain district, is far more temperate in climate, because of the generally higher level of the country. This region is largely covered with immense forests of hardwood, dyewood, and other kinds of trees. There are several important rivers in this district, some of them being navigable during the rainy season.

In the central section are located Flores, San Andres, San Benito, La Libertad, San Jose, and most of the other small cities and towns of the Department. Timber is not so plentiful here, the country being covered with long grasses of considerable value for grazing purposes; it might also be important as an agricultural center, since coffee, henequen, sugar, and all kinds of cereals grow readily. There are no navigable rivers in this section, the principal body of water being Lago San Andres; on an island in this lake is Flores, the capital of the Department. There are also a number of small lagoons.

The western section of the Department comprises the basin of the Usamacinta River, one of the largest and most copious streams in Central America. The region is largely covered with forests, although there are some parts of it highly suitable for cattle grazing.

The entire Department of Peten exported, during 1913, 387,837 pounds of chicle, valued at $142,108 United States currency; 186,626 tons of hardwood, valued at $167,000; about 27,000 pounds of rubber, and a very small amount of other products. Although many thousands of cattle might be maintained in the Department, if it were within reach of the world's markets, to-day only about 2,000 animals are to be found. As previously stated, the entire future of the Department, which bids fair to become in time the chief source of wealth of the Republic, is dependent upon the establishment of means of communication with the outside world. The fine hardwood trees, being sinkable, are obtainable at the present time only at great cost and with considerable difficulty. Labor is also scarce, as is evidenced by the small population. The Department's resources will not always remain undeveloped and therefore are worthy of more than passing notice. Opportunities will present themselves for the establishment of sawmills and lumber mills and for the general development of the forest products, and the comparative nearness of the territory to the United States will insure transportation at moderate cost.

FOREST RESOURCES.

The forest wealth of the Department of Peten has been discussed at length in the several preceding paragraphs. The timber areas of the Republic are by no means confined to Peten but are distributed far and wide. The entire lumber and hardwood industry is merely in its infancy, and development will of necessity be slow. Transportation means are extremely limited in most of the forest-covered districts, and the methods followed in cutting and sawing the timber are not always the most modern.

STOCK RAISING.

Guatemala contains vast areas of good cattle-grazing lands and there is every reason to believe that the cattle industry will in time become important. Increasing attention is being given to the introduction of blooded stock. Refrigeration plants are being established and everything connected with cattle raising is being carried on in a more modern way. The number of cattle in the Republic at the beginning of 1914 was estimated at 556,843; the total to-day is probably 650,000. In 1914 there were, in addition to the cattle, about 64,000 horses, 515,000 sheep, 33,000 mules, 190,000 hogs, and 11,000 goats. The Government has not heretofore encouraged the exportation of cattle, although there has been a good business in hides. In the past most of the cattle raising in the more northerly Departments has been carried on along the lines followed in bygone days in the United States and at present on the plains of Western and South Australia, the cattle being allowed to range freely over open and unfenced areas.

AGRICULTURAL PRODUCTS.

Coffee is the principal product of Guatemala and normally forms more than five-sixths of the nation's exports. A very large part of the Pacific slope and two or three of the Departments on the Atlantic side of the Republic are mainly given up to coffee plantations. According to a statement of United States Consul Lupton, there were, at the close of 1913, 2,079 coffee plantations, owned as follows:

Nationality.	Number of plantations.	Production in quintals of 101 pounds.	Nationality.	Number of plantations.	Production in quintals of 101 pounds.	Nationality.	Number of plantations.	Production in quintals of 101 pounds.
Guatemalan....	1,657	525,356	Spanish........	84	12,651	Salvadorean....	11	2,255
German........	170	358,353	French.........	21	1,119	Swiss..........	9	14,185
Austrian.......	4	630	Honduran......	7	6,508	Mixed companies........	6	12,920
Belgian........	9	5,018	Italian..........	19	15,380			
Colombian.....	7	1,265	English.........	20	12,046			
Costa Rican....	2	1,008	Mexican........	29	700		2,079	1,046,236
Chinese........	1	15	Nicaraguan....	5	140			
Chilean........	2	57,402	American......	16	19,285			

There is in the Republic a Banco Agrícola Hipotecario, with head offices at Guatemala City. This Mortgage Bank makes loans on coffee plantations, and the banks in general make advances on coffee crops.

The total coffee production of Guatemala for the year 1913 was 1,177,298 quintals, of which 875,337 quintals was exported. The indications are that the coffee industry for many years to come will occupy first place among the various industries of the Republic.

The United Fruit Co. has for some years occupied the most important place in the banana industry. A large part of eastern Guatemala is suitable for the growth of the fruit. The United Fruit Co. owns in this part of the Republic 25,549 acres of improved and 114,444 acres of unimproved land and leases 1,773 acres of improved and 65,619 acres of unimproved land. Of the improved land, 25,841 acres are cultivated for bananas. The total value of the United Fruit Co.'s properties in Guatemala was stated, as of September 30, 1916, to amount to $4,751,288, as compared with $4,949,041 in 1915. The company, occupying by far the most important position among the banana producers of Guatemala and other parts of Central America, is able to produce at a very much lower cost than independent growers. There are, however, a number of independent plantations, the production of a number of these being sold to the United Fruit Co.

The sugar industry in Guatemala is likely in time to become of considerable importance. Exports of various grades of the product are increasing, and there is plenty of land available for the raising of much larger crops. A few small mills and refineries exist. Before the war a very large part of the sugar was shipped to the markets of Europe, this sugar being mostly of a somewhat low grade. There is plenty of opportunity for the introduction of more up-to-date methods and more modern machinery.

Many varieties of cereal crops grow readily in Guatemala.

INDUSTRIAL AND MANUFACTURING ACTIVITIES.

It is hardly necessary to say that progress along industrial and manufacturing lines has been decidedly slow. Primarily agriculturists, the inhabitants have been slow to take up manufacturing, although progress along certain lines has been noted. There are a few sugar mills and refineries, several small tanneries, and a shoe factory operated by steam power; this last factory also makes envelopes and stationery as a side line. Two fair-sized breweries have been established, one in Guatemala City and the other in Quezaltenango, the former being locally owned. A number of cabinet works, tobacco, soap, candle, mineral and soda water, and other factories are found. The Cantel Cotton Mills at Quezaltenango do a very substantial business, the company manufacturing a variety of cotton goods and thread. This company raises part of the cotton it uses, but buys by far the larger share from the United States.

PRESENT OUTLOOK.

In conclusion the writer desires to quote from "Central America as an Export Field," by Garrard Harris, special agent of the Bureau of Foreign and Domestic Commerce:

> It is evident that the time is ripe for investment in Guatemala. At the close of hostilities in Europe loans will be called on many of the coffee and sugar properties. It is likely that many of these will be sold at very low prices. There will be a general demand for money—at high interest—with which to liquidate European indebtedness.
>
> The country is in good condition. The laws are liberal and well administered, and the nation has made great progress in the last 15 years. Of this progress the people, who are very patriotic, are justly proud.

HONDURAS.

INTRODUCTION.

Honduras, with an area slightly in excess of 45,000 square miles and a population of approximately 600,000, is bounded by the Republics of Guatemala, Salvador, and Nicaragua and by the Caribbean Sea and the Pacific Ocean (Gulf of Fonseca).

The Republic has been somewhat backward in its development, a fact largely accounted for by the almost absolute lack of internal communication. Through the central portions of the country nothing but the roughest trails exist, the pack mule being practically the only freight carrier. Tegucigalpa, the capital (population about 28,000), is without rail communication of any kind, the trip from that city to Puerto Cortes, the only accessible Caribbean port, taking upward of two weeks, with hardly a hotel available en route. The city is readily accessible only via the port of Amapala on the Gulf of Fonseca.

Such foreign investments as have been made in Honduras during recent years have, in general, turned out quite well; most of the invested capital has been utilized in the development of banana plantations and for mining purposes.

GOVERNMENT LOANS AND FINANCES.

The Republic of Honduras is to-day shouldering a national debt far beyond its resources, interest on which is neither earned nor paid. The responsibility for this debt can not be placed on those who have ruled the country's destiny during the present day and generation, but was forced on the nation largely through circumstances beyond its control.

The financial condition of Honduras is the result of the attempted construction of an "Interoceanic" railway from Puerto Cortes on the Caribbean Sea to Amapala Bay on the Pacific Coast. The scheme had its origin shortly after the discovery of gold in California, and at about the date of the construction of the Panama Railroad. It was largely the idea of Mr. E. G. Squire, still famous for his books on Latin America. Mr. Squire formed a company to carry out the enterprise, but met with great opposition on the part of the owners of the Panama Railroad. Finally in 1858 some survey work was done under the direction of Gen. William W. Wright, an American, the cost being approximately $400,000. The length of the line as located was to have been about 250 miles. The outbreak of the Civil War in the United States, however, brought about the collapse of the company and ended Mr. Squire's connection with the enterprise.

In the year 1867 the Government of Honduras, following extended negotiations with certain contractors, gave a concession for the construction of the railway, issuing £1,000,000 10 per cent bonds, which were offered publicly in England and on the Continent of Europe by Messrs. Bischoffsheim & Goldschmidt at 80 per cent. The Government agreed to provide an annuity of £140,000 during the years 1870 to 1884, inclusive, also promising the subscribers one-half of the railway profits for the years 1885 to 1899, inclusive.

Prior to the marketing of the above bond issue, the debt of the Republic was £90,000, representing a loan dated 1867, bearing interest at 5 per cent per annum. These bonds had been issued largely to liquidate this Republic's share of the debt of the former Central American Federation dissolved in 1822. Certain floating obligations of the nation were also provided for by the loan, thus clearing up all of the unpaid principal and interest on debts previously contracted.

In 1869 Messrs. Dreyfus & Co., of Paris, sold for the account of Honduras £2,490,108 bonds, bearing interest at the rate of 6⅔ per cent. These bonds, which were publicly offered at 75 per cent, were, like the bond issue of 1869, brought out to provide funds for the construction of the railway, and were secured on the railway property and on the nation's forest domains. Seventeen years was to have been the life of the issue, the bonds being retirable through a sinking fund.

Finding that the European investing public was in the mood for the purchase of Government bonds yielding fabulous returns, the contractors prevailed upon Honduran authorities to authorize another loan, this time for the sum of £2,500,000. The bonds were offered in London (year 1870) at 80 per cent and bore interest at 10 per cent. As an additional attraction it was agreed that the bonds would be paid off at par in 34 semiannual drawings. The designated security for the loan was the railway, its revenues, and the produce of State Domain. Messrs. Bischoffsheim & Goldschmidt were the bankers, acting for the account of Mr. C. J. Lefevre.

Early in the year 1873 the interest on the various loans, which until that time had been paid out of principal, was defaulted. A total of 57 miles of the line had been completed at a cost of probably not more than $1,500,000. To cover the cost of the construction of this mileage a debt of £5,990,108 had been contracted. Sinking-fund operations had reduced the total to £5,398,570. No interest has since been paid on these bonds or on the £90,000 bonds of 1867, and the total debt, with interest accrued to January, 1917, amounts to approximately £26,000,000.

To tell the story of the numerous attempts that have been made by both Government and bondholders to effect a settlement of this debt would require a volume. The railway remained in an uncompleted state and was allowed to fall into a deplorable condition. A bridge that had been swung across the Chamelicon River collapsed, rendering about 20 miles of road useless. About a dozen years elapsed before this bridge was replaced, and it was not until several years ago that the line was put in fair order. Recently a short extension was completed, carrying the line a few miles farther into the interior.

While admittedly this railway will no longer be of great value as an "interoceanic" route, it is stated that sufficient local and export business could be developed to assure the success of the extension across the Republic. Access would be provided to various cattle lands, to the mineral wealth of the country, and to the centers of population. There is no question that Honduras has vast undeveloped resources. The 10 per cent bonds of 1867 and 1870 are quoted on the London Stock Exchange at about 5 per cent.

According to statistics of the Government, the public debt of Honduras, other than the old railway loans, amounted, as of January 1, 1916, to 4,165,475 pesos (1 peso=$0.3537 United States currency at normal exchange). This figure compares with 4,877,894 pesos as of June 30, 1914, a decrease of 712,419 pesos, and with 5,747,743 pesos in 1913.

At the First Pan American Financial Conference held in Washington May 24 to 29, 1915, suggestions were made on behalf of the Government of Honduras looking toward the settlement of the railway loans. Certain export duties, it was proposed, would be increased, and other methods adopted to augment the present small national revenue of the Republic. Thus far no arrangements have been made along the lines suggested. The financial condition of the Republic is, however, steadily improving, and hopes are entertained for a satisfactory solution of its problems.

None of the Departments or municipalities have, so far as is known, any bonds outstanding in the hands of the public. Such improvements as have been carried out have generally been financed by the National Government. Direct taxation on property is not usually resorted to as a means of raising revenues, and the financial systems in use throughout the Republic are wholly different from those of the United States. A few of the municipalities are supposed to have small floating debts, mostly due the Government.

BANKS.

There are three banks of issue in Honduras, the Banco de Honduras, Banco de Atlantida, and Banco de Comercio. The first-named bank has its headquarters in Tegucigalpa and is said to have a capitalization of 417,500 pesos and bank notes outstanding to the amount of 505,000 pesos. The Banco de Atlantida is located at Ceiba and is the principal banking institution for the banana planters and the merchants of that locality. Its capitalization is $250,000 United States currency ($500,000 authorized), and it has notes in circulation to the amount of 236,000 pesos. The Banco de Comercio is located at Tegucigalpa; its capitalization is 500,000 pesos and its note circulation 44,000 pesos. These banks may issue paper to the amount of 200 per cent of their outstanding stock, subject to a silver reserve or deposit of 50 per cent. Banking laws are practically nonexistent, the National Commercial Code governing banking operations. Mortgages and short-time loans normally carry interest at the rates of 10 to 12 per cent and form a large part of the business of these banks.

In addition to the three banks of issue there are several private banking and importing firms doing a general business of this character. Exchange is subject at times to very wide fluctuations. The country is on a silver basis, and American as well as local coins circulate freely.

RAILWAYS.

Railway expansion in Honduras has been extremely slow. In the year 1916 the total length of all lines in operation was approximately 517 kilometers (321 miles). All the railway mileage in operation is located on the Caribbean side of the Republic; most of it was built primarily for the banana and timber trades and only secondarily for the purpose of handling public traffic.

The National Railway of Honduras, although only about 88 kilometers (55 miles) in length, is probably entitled to rank as the most important railway in the Republic. The line has its terminus at the Caribbean port of Puerto Cortes and runs via San Pedro Sula inland for a short distance. The railway is the uncompleted section of the Interoceanic Railway of Honduras which was to have crossed the country to the Pacific Ocean. The project was first given publicity in 1850, following the gold rush to California, was surveyed in 1858, and turned over by its promoters to the Honduran Government a few years later. The development of the enterprise brought about the bankruptcy of the Republic and saddled it with a debt far beyond its possible resources (see "Government loans and finances," p. 420).

At the close of 1915 the valuation of the National Railway of Honduras was stated as 3,193,176 pesos (peso=$0.3841). The gross receipts for the railway during that year totaled 429,126 pesos. In 1913–14 gross receipts totaled 280,346 pesos.

The line of railway operated by the banana-exporting firm of Vaccaro Bros. & Co. runs from the port of La Ceiba to San Juan and to various points in the interior, approximately 150 kilometers (93 miles). Yoro, the capital of the State of Yoro, is said to be the ultimate destination of the railway.

The Tela Railroad operates approximately 150 kilometers (93 miles) of line, including 37 kilometers (23 miles) of main track and 113 (70 miles) of branches. At the beginning of 1916 about 22 kilometers (14 miles) of additional roadway had been graded. The company owns a wharf at Tela, 606 meters (1,988 feet) long and 14 meters (46 feet) wide, fitted to accommodate large steamers. This is said to be one of the best-equipped wharves in Central America. In 1915 the Tela Railroad carried 840,000 bunches of bananas, 14,134 tons of general freight, and 1,362 passengers. The equipment consists of 8 locomotives, 7 gasoline trolleys, 3 passenger cars, 1 baggage and mail car, and 122 freight cars. About 96 kilometers (60 miles) of telephone line are operated and a number of buildings owned. The valuation of the property has been placed at $3,000,000. It is said that upward of 4,500,000 bunches of bananas will be produced by the company annually.

The Trujillo Railroad is approximately 41 kilometers (25 miles) in length, and the output of bananas along the line is expected to reach 10,000,000 to 12,000,000 per annum. Plans call for the construction of large additional mileage. The railway terminates at the port of Trujillo.

The Cuyamel Fruit Co., which is said to have invested about $2,000,000 in its enterprises, operates about 44 kilometers (27 miles) of line. Other short lines in northern Honduras are operated by the Tropical Timber Co. (7 miles), the United Fruit Co., etc. The United Fruit Co., as of September 30, 1916, had invested the sum of $3,777,408 in its railway enterprises in Honduras and $9,730 in the construction of tramways to fruit plantations. The mileage owned or in operation under control of the United Fruit Co., amounted, as of September 30, 1916, to 183 miles. In addition, 9 miles of tramway lines were in operation. A total of 24 locomotives, 372 railway cars, and 27 tramway cars were in use. The United Fruit Co. lines were practically devoted to the company's fruit traffic.

The International Railways of Central America have surveyed a line across the Pacific slope of Honduras, to extend from the terminus of the Salvador Division of the railway to the boundary with Nicaragua. The line, if constructed, will open up for development the Departments of Valle and Choluteca. It is presumed that the International system will eventually be carried through to Costa Rica and Panama. The Honduras section of the system is to be approximately 88 miles in length.

A number of railways to develop the resources of the interior have been projected. One of these lines, it is expected, will eventually be carried as far as Juticalpa and possibly to Tegucigalpa, the Republic's isolated capital. Important interests are said to be financially interested in this project.

The railways of Honduras burn coal as fuel, but some of the lines, at latest accounts, were contemplating changing to oil owing to the present high price and scarcity of the coal. Operation by electricity generated from the readily available water power has been advocated, but, because of the small amount of available traffic, this would hardly warrant the expense.

A project being carried out by an American company calls for the construction of an automobile road from the inland terminus of the National Railway of Honduras to the shore of Lake Yojoa, 30 miles, and the building of a steamer for operations on the lake, which steamer will handle traffic from end to end of the lake, 30 miles, and will connect with a proposed automobile road to Tegucigalpa, the capital. Plans have been laid for the conversion of the automobile highway into a railway. The completion of the undertaking will shorten the route from the Caribbean Sea to the capital from seven days to a day and a half, or less. It is expected that the development of this enterprise will deflect to this route a large amount of the traffic destined to Tegucigalpa and other interior points. Under conditions previously existing freight was not booked by the Caribbean-Puerto Cortes route, but was sent via the Panama Canal and the Pacific port of Amapala.

An American company operates a line of small steamboats on the Ulua River, running from Progreso to connect with the Tela Railroad for the port of Tela.

PUBLIC UTILITIES.

There are at the present time no street-railway systems in Honduras and presumably no gas enterprises. Electric lights have been installed in Tegucigalpa, the capital, Cuyamel, Ceiba, and San Pedro Sula, and possibly in one or two of the smaller towns. Several additional lighting properties are projected. The electric light and power enterprise that operates in Tegucigalpa and its environs has three plants located at Centro, Leona, and Rio Chiquito. Gross receipts for the year 1915 totaled 53,734 pesos and operating expenses 51,579 pesos.

The telegraph and telephone service of Honduras, as of December 31, 1915, totaled 7,829 kilometers (4,865 miles), an increase of 631 kilometers (392 miles) as compared with December 31, 1914. The service covers the most important centers of the Republic.

Opportunities will present themselves, as the country progresses, for the establishment of water, sewerage, electric lighting and power systems, and other public works. Tegucigalpa and its port, Amapala, are at present connected by a service of passenger and freight automobiles, which service will doubtless be extended following the construction of additional roads. The company operating this automobile line is said to earn a substantial profit.

MINING ENTERPRISES.

Minerals are known to exist in almost every Department in the Republic. In the days of the Spanish Conquest a large amount of gold and silver was mined and Honduras was considered one of the treasure houses of the Empire. It is said that in one year (1594) $7,500,000 in gold and silver was taken from the Santa Lucia mines, near Tegucigalpa. This statement may or may not have been true, inasmuch as many exaggerated stories are told concerning the fabulous sums realized from the mines during the Spanish days; but it is known that the sixteenth and seventeenth centuries witnessed the production of very large quantities of minerals in Honduras and the other Central American States.

Despite the fact that numerous mining claims are held during the present era, and that attempts have been made to develop many of these claims, there is only one important mining property being operated at the present time. This is the New York & Honduras Rosario Mining Co.'s mine at San Juancito. This long-established American company has been highly successful, and its record of silver production is probably the best for any silver mine in Central America during modern times. In addition to its Rosario properties at San Juancito the company has been experimenting with various prospecting concessions at Chile Mountain, Guasucaran, Department of Tegucigalpa, and Santa Rosa de Potosi, Department of Choluteca. The Chile Mountain concession, located about 20 miles east of San Juancito, was prospected during 1916, but without sufficient encouraging results to make further investigation desirable. Development work was also carried forward in the Guasucaran and Santa Rosa de Potosi properties, but the possibilities of the properties had not been determined at the close of 1916. The following table showing production and dividend record is interesting:

Years.	Value of bullion production.	Dividends paid.		
		Numbers.	Amount.	Per cent.
1882	$2,452	...	...	...
1883	12,900	...	...	...
1884	149,741	...	...	...
1885	244,445	...	...	...
1886	224,158	...	...	...
1887	613,446	1	$37,500	2½
1888	767,632	2 to 5	60,000	4
1889	590,190	6 to 14	150,000	10
1890	113	...	...	...
1891	369,587	15 to 16	30,000	2
1892	614,499	17 to 21	165,000	11
1893	492,535	22 to 25	150,000	10
1894	392,486	26	37,500	2½
1895	158,164	...	...	...
1896	449,526	27 to 28	30,000	2
1897	568,872	29 to 40	180,000	12
1898	611,468	41 to 48	120,000	8
1899	798,995	49 to 60	180,000	12
1900	827,443	61 to 75	225,000	15
1901	780,760	76 to 73	300,000	20
1902	490,273	94 to 100	105,000	7
1903	436,818	101	15,000	1
1904	721,375	102 to 108	105,000	7
1905	993,065	109 to 121	180,000	12
1906	1,112,172	122 to 139	285,000	19
1907	791,348	140 to 153	210,000	14
1908	788,910	154 to 165	180,000	12
1909 (10 months)	636,500	166 to 173	120,000	8
1910	890,700	174 to 180	105,000	7
1911	887,170	181 to 182	90,000	6
1912	944,213	183	30,000	1½
1912–13 (12 months)	1,051,273	...	...	...
1913 (last 3 months)	328,100	184 to 188	220,000	11
1914	1,239,877	189 to 193	240,000	12
1915	1,191,761	194 to 197	240,000	12
1916	1,553,115	198 to 205	400,000	20
Total	22,726,082	...	4,190,000	...

NOTE.—Dividends 1 to 182, inclusive, on capital stock of $1,500,000; dividends 183 to 205, inclusive, on capital stock of $2,000 000.

Dividend payments for the calendar year 1917 totaled $400,000 or 20 per cent on the $2,000,000 stock outstanding. Profits for 1916 totaled $596,093 and after reserves $460,110.

The ore reserves of the New York & Honduras Rosario Mining Co., as of December 31, 1916, were estimated at 312,143 tons, valued at $2,970,698 United States currency, or $49.51 per ton, this comparing with ore reserves of $3,353,098 (343,716 tons) on December 31, 1915, and with $4,380,446 (418,978 tons) at the close of 1914. The per-ton value of the ore in 1915 and 1914 was stated to have been $9.76 and $10.75. The company has excellent water power available and its plant and property are efficiently managed and very extensively developed along the most modern lines. The equipment in service includes an electric compressor, air-drills, a 350-ton stamp mill, cyanide plant, 1,200-horsepower electric plant, Ball mill, Dorr thickener tank, etc. In addition to the annual production of silver, fair amounts of gold (15,904 ounces in 1916) are obtained.

The $10 par value shares of the New York & Honduras Rosario Mining Co. have been quoted during 1916 and 1917 at prices ranging from $13 to $19 per share.

A number of other properties are being or have been operated in a small way during recent years. The Santa Lucia Mine near Tegucigalpa, a famous producer during the Spanish period, was at last accounts under the management of local interests. It is claimed that large returns could be realized from this property, if it were extensively developed. The Socorro Mine, in the district near Tegucigalpa, which covers an area of about 300 acres and produces gold and silver, is the property of the Socorro Gold & Silver Mining Co., a British concern (5 Fenchurch Street, London, E. C., England), capitalized at £120,250. The production for 1914–15 was estimated at £11,552, and the loss for the year's operations amounted to £4,771. The Antigua Gold-Copper Co., an American company incorporated in 1907, with a capitalization of $2,000,000, acquired 531 acres at Minas de Oro, Department of Comayagua (about 100 miles southeast of Puerto Cortes). The property was worked in early days and showed outcroppings of gold and copper. The assays at the time of the organization of the property were stated to show 2 to 3 per cent copper, 2 to 4 ounces silver, and $2 to $4 gold per ton, in limestone. A stamp mill of 30 tons daily output and other improvements were installed by the company. No recent statement of operations is obtainable.

Copper ores are found in almost every Department of Honduras, but the mines are usually small and development has been very limited. Thus far the most promising deposits have been located in the Departments of Tegucigalpa, Comayagua, and Yoro. In the latter Department a vein is said to have been located with a width in places of as much as 14 feet, extending, it is claimed, for miles and giving ores "assaying 15 to 16 per cent copper." This copper vein and other ore bodies of presumably smaller dimensions occur about 40 miles from the Uloa River, in a region not easily accessible under present transportation conditions.

As stated, mineral traces and abandoned Spanish workings are widely scattered throughout the Republic. An extensive iron deposit exists at Agalteca, about 48 miles northwest of Tegucigalpa, this ore body being said to contain 100,000,000 tons. Efforts have been made to raise sufficient capital to develop this ore body, but these efforts have thus far been unavailing. Iron is found in other sections of the mountain ranges, and traces have been seen of lead, antimony, aluminum, zinc, nickel, coal, kaolin, asphalt, saltpeter, chalk, petroleum, etc. Some exploitation of petroleum has been carried out in the Puerto Cortes district, and some hopes are expressed that paying quantities of the oil may be obtained. Similar predictions are made concerning the Pacific coast section of the Republic.

Gold washing is carried on in many of the streams, and sometimes 1,000 or more of the inhabitants are daily engaged in the work. This primitive method of obtaining the precious mineral is said to pay a modest yet ample return to those engaged in the industry. Juticalpa is the center of this industry.

Some hopes are entertained that certain deposits of antimony located in the Lake Yojoa and Yoro districts may in time be worked with substantial profits. Shipments of very high-grade ore have been made, but the profitable development of the mines await better transportation facilities.

Taken as a whole, Honduras will presumably take first rank in the future among the Republics of Central America as a producer of minerals. The country at present, however, is almost devoid of means of transportation. There is only one railway that can really be spoken of as a common carrier, only a few isolated river transportation lines, and an almost complete absence of roads or even trails. When these transportation difficulties have been overcome (a somewhat difficult matter, considering the mountainous nature of such a large part of the country) the future of the industry seems assured.

AGRICULTURAL AND PASTORAL INDUSTRIES.

The United Fruit Co. has been the prime mover in the agricultural development of Honduras. This company had invested to September 30, 1916, the sum of $7,614,535 in the Republic, this including $917,130 in lands, $849,641 in cultivation, $805,028 in houses and other buildings, $3,777,408 in railways, $253,651 in wharves and lighters, etc. The company owned 18,435 acres of improved and 144,702 acres of unimproved land, and leased 170 acres of improved and 16,938 acres of unimproved land. Of the land under cultivation, 12,914 acres were used for raising bananas, 97 acres for coconuts, and 21 acres for rubber. In addition, 1,531 acres were used for pasturing live stock, 420 head of cattle, 977 mules and horses, and 143 other animals being owned. The railway and tramway lines serving the company's properties totaled 183 miles and 9 miles, respectively.

In addition to the United Fruit Co., extensive plantations are owned by Vaccaro Bros. & Co., the Cuyamel Fruit Co., etc. There are also a number of independent planters. Concerning the condition and future of the industry United States Consul Walter F. Boyle, at Puerto Cortes, reported under date of January 13, 1917:

> During 1916 the banana industry suffered many reverses, with resultant unsatisfactory business conditions. The "chapulin," or locust plague, continued unabated and destroyed a large quantity of fruit as well as many other crops. There were several bad blow-downs at various places in the district and a long series of floods which retarded for several months the fertile banana-producing territory along the Ulua and Chamelecon Rivers. Short periods of overflow do not affect the banana crop: on the contrary, the silt brought down by the flood improves the soil, but long and continued periods of overflow damage the plants and retard production for many months.
>
> The cultivation of the banana is simple. The land is cleared by felling the big trees and burning the underbrush, then the bananas are planted and subjected to a semiannual cleaning and pruning with the big sword-like knife known as a machete. There is no plowing, harrowing, or laying by of the crop; the stumps and trunks of the felled trees are not removed from the land, and in a few years they decay and thus return to the soil much needed humus required by the banana plant.
>
> The real problem is that of rapid transportation and distribution, which requires a system of railroad and tram lines in Honduras, terminal facilities, steamship lines, and a marketing organization in the United States all working together. Cuttings are ordered by telegraph and must be accomplished in from 24 to 36 hours, and once the fruit is cut every handling follows in quick succession, day or night.
>
> The banana bunch or stem is divided into "hands," and the individual bananas growing on the hands are known as fingers. The standard or payable bunch is the one of nine hands or over. Many short-hand bunches go to waste annually.

Banana exports to the United States in 1916 totaled $2,885,776 (10,654,369 bunches).

Coffee, coconuts, cacao, rubber, sugar, as well as maize and various cereal crops are grown in moderate quantities. The coconut industry of Bay Islands is important, there having been exported to the United States in 1915 and 1916 (largely from Bay Islands) 12,359,645 and 9,676,982 coconuts, respectively, valued at $220,289 and $306,758. Coffee exports to the United States in 1915 and 1916 totaled $55,922 and $43,260. Crude rubber exports to the United States in 1916 were valued at $49,622.

The cattle industry gives signs of promise. Honduras is an excellent cattle country, although exports of the animals have been greatly retarded owing to the presence of tick. It is estimated that there are between 350,000 and 400,000 cattle in the Republic, and it is claimed that a meat plant would handle a substantial business for export. During 1915 and 1916 cattle products (mostly hides) were shipped to the United States to the value of $294,250 and $352,133, respectively. Live cattle are also exported to British Honduras, although not in very large numbers. Formerly a considerable number of cattle were shipped to Cuba, and of late several attempts have been made to revive the trade.

Following the introduction of improved stock for breeding purposes and the establishment of a small refrigeration plant, probably at San Pedro Sula or Puerto Cortes, it is estimated that 50,000 beef cattle might readily be marketed annually.

FOREST WEALTH.

Honduras contains considerable timber wealth, including mahogany, rosewood, cedar, pine, and other kinds of wood. Although a great many of the trees, located within short distances of the various Carribbean ports, have been cut, there are still countless trees standing in the less accessible interior, along the banks of streams and elsewhere. Some of the timber companies have built railways into the thickly timbered districts, and further extensions along these lines will doubtless be carried out. The establishment of better means of interior communication and the improvement in the marine shipping situation will probably bring about the rapid expansion of the timber industry. In addition to the less accessible hardwoods, pines, etc., there are large areas of assorted softwoods that might be available for making paper, etc.

MANUFACTURING.

Honduras lays no claim to being a manufacturing country, its development in that field being probably the smallest of any country in Latin America. The following table was compiled by Special Agent Garrard Harris, of the United States Department of Commerce, from the records of the Department of Promotion of the Honduras Government:

Department of Tegucigalpa.—Population about 85,000. Two small shoemaking plants; two small soap and candle factories, one with a small sawmill attached; three makers of bottled soft drinks; one ice plant, bottled-drinks establishment, and small sawmill; two small breweries; one factory making sugar and aguardiente, or rum; one small gristmill; one small sawmill; one small cigar factory, and one making cigars and cigarettes; one hat factory, making straw and palm hats; two makers of brick and dealers in cement; one marble yard, handling also bricks and cement; two small bakeries; one small candy factory; one leather-working shop; and five establishments making aguardiente only.

Department of Atlantida.—Population about 10,500. One factory making aerated water; one making bottled soft drinks; another making soft drinks and ice also; one making ice solely; and one making aguardiente.

Department of Valle.—Population about 34,000. One soap factory; four making "aguas gaseosas" or aerated water, soda pop, etc.; one ice factory; and one tanyard.

Department of Choluteca.—Population about 47,000. Four soft-drink bottling establishments; one brick and cement establishment; one tanyard; and two factories making aguardiente.

Department of Cortes.—Population about 24,000. One soap and candle factory; two distilleries making aguardiente; one making soft drinks; and three ice factories. All are small.

Department of La Paz.—Population 28,000. Two distilleries making aguardiente, and one making wine from oranges.

Department of Islas de Bahia.—Population 5,000. One soft-drink factory; one making ice and ice cream; and two boat-building yards.

Department of El Paraiso.—Population 7,000 (estimated). Four aguardiente stills and one soft-drink factory.

Department of Copan.—Population 44,000. Thirteen factories making "puros" or native cigars, and four stills making aguardiente.

Department of Colon.—Population 15,000. One ice factory.

Department of Yoro.—Population 20,000. Three aguardiente stills.

Department of Santa Barbara.—Population 37,000. Five aguardiente stills; one sawmill; and one soap, candle, and ice factory combined.

Department of Ocotopeque.—Population 19,000. One gristmill, and one aguardiente still.

Department of Olancho.—Population 45,000. Two straw-hat factories, and two aguardiente stills.

Department of Gracias.—Population 40,000. One straw-hat factory, and two aguardiente stills.

Department of Intabuca.—Population 27,000. One hat factory (straw or palm), and one aguardiente still.

Department of Comayagua.—Population 30,000. Four aguardiente stills.

SURVEYS BY AN AMERICAN COMPANY—PROPOSED UNDERTAKINGS.

According to a report by United States Consul E. M. Lawton, an American company during the past two years has been making extensive surveys and study of the mouth of the Patuca River in order to form an estimate of the cost of properly developing the Mosquito Reservation. The Honduras Government is now considering the proposals made by this company.

The project is distinctly in line with a measure passed at a recent session of Congress for a free port at the mouth of this river, especially for the development of that section.

The concessionaires propose to dredge the Patuca bar to admit ocean-going steamers; to build wharves at the new port of Herrera, together with customhouse, "comandancia," and all necessary Government buildings; install wireless telegraph and telephone systems, and erect lighthouses, all of which will become the property of the Government at the expiration of the concession. For its own use the company proposes to erect sawmills, turpentine stills, dye works, sugar refinery, and meat-packing house. In addition to the improvements of the bar and the Patuca River it expects also to build canals connecting the Patuca and Wanks Rivers with the Caratasca Lagoon, so that not only the Patuca but the Wanks River as well will have navigation facilities.

The company asks for Government grants of timberland to the extent of 125,000 hectares of land (about 310,000 acres), to be selected on alternate sides of the river and alternating with Government tracts. The duration of the concession is 25 years.

The estimated cost of the bar dredging and lighthouse is $100,000 and a like sum for the necessary wharves and wireless station.

Honduras, despite its lack of transportation facilities, is a country offering numerous opportunities for development and is a field certain to attract American capital.

NICARAGUA.

INTRODUCTION.

The Republic of Nicaragua, with an area of slightly more than 50,000 square miles, is presumed to be the largest among the Central American countries. Its estimated population is 600,000, of whom about 35,000 reside in Managua, the capital, 45,000 in Leon, and from 15,000 to 20,000 each in Chinandega, Granada, and Masaya. A large majority of the inhabitants live in the western and northwestern sections of the Republic. The principal ports are Corinto, on the Pacific Ocean, and Greytown, Bluefields, and Cabo Gracias a Dios on the Caribbean coast.

The principal exports of Nicaragua are coffee, hides and skins, gold, hardwoods, and bananas. The principal customer is the United States, France usually ranking second. The country is primarily given up to agriculture, although mining, cattle raising, and timber cutting have received attention. The United Fruit Co. holds about 170,882 acres of land in Nicaragua, all of which is unimproved.

FUNDED DEBT.

Nicaragua's financial history virtually dates from 1827, in which year it assumed approximately £27,200 of the debt of the dissolved Central American Federation. This debt was settled in 1874.

In 1886 £285,000 bonds of the Nicaragua Railways, bearing interest at the rate of 6 per cent per annum, redeemable in 1919, were issued, being publicly offered at 92½. This issue was converted in 1909 into 6 per cent bonds authorized during that year, the basis of exchange being £86 in new bonds for each £100 of the railway bonds.

In 1904 a 6 per cent loan to the amount of $1,000,000 United States gold was negotiated at 75 per cent in the American market, this loan being retirable at the rate of $200,000 every five years until final maturity. In 1905 a small loan was contracted in Europe, being in the form of an advance against collateral. Both of these loans were converted or redeemed in 1909 (see next paragraph).

The Government authorized in 1909 £1,250,000 6 per cent sterling bonds, of which £500,000 were to be used to convert or redeem the various outstanding loans, as above, £570,000 for the construction of a railway line from Lake Nicaragua to the Caribbean Sea, and £180,000 for the general purposes of the Government. The bonds were offered in London and Paris at 92 and 93½, respectively, or were exchanged for the bonds of the Railway Loan at 86 per cent. Certain customs receipts and revenues were assigned for the annual service of the loan, which amounted to £87,500. The cumulative sinking fund was to have retired the loan within 35 years from January 1, 1910.

Interest on the loan was paid through 1911, partly through unexpended principal, but was suspended in 1912. In the same year an agreement was entered into between Brown Bros. and J. & W. Seligman, of New York, representing the Republic of Nicaragua, and the Council of Foreign Bondholders, London, representing the bondholders. Under the arrangement the January, 1912, coupon was paid in full and the July, 1912, and January, 1913, coupons at the rate of 5 per cent per annum, the necessary amount being provided through the unexpended balance of the principal of the 1909 loan. All future coupons were to be at the rate of 5 per cent per annum. The arrears in the sinking fund were to be paid and the fund was to be maintained at 1 per cent per annum during the life of the loan. The bondholders were to have an unconditional first lien on the customs revenues during the life of the loan, relinquishing their rights to any other security. In the event of failure to make necessary payments on the loan the interest was to revert to the former rate of 6 per cent.

In January, 1915, the interest on the loan was suspended owing to the falling off in customs revenues and the general financial condition of the country, due to the war. In accordance with a law passed in March, 1915, four-fifths of the coupons due January, 1915, were paid, with interest at 6 per cent to April 30 on the full amount of the coupons. The Government made arrangements for the future service of the loan, but owing to the continued depression was unable to carry these arrangements into effect.

These bonds were quoted in January, 1918, at 60. Of the original issue of £1,250,000 bonds, £1,179,620 remain outstanding.

Mention should be made of the financial plan adopted by Nicaragua in the law of February 14, 1917, for the purpose of reorganizing and consolidating certain of its external and internal debts. In accordance with this law a Commission of Public Credit was established, consisting of three members—one, a citizen of Nicaragua, appointed by the President of the Republic; another, a citizen of the United States, appointed by the Secretary of State of the United States; the third, acting as umpire in case of disagreement between the other two members, appointed by the Secretary of State of the United States from among the Permanent Nicaraguan Group Committee established during the Pan American Financial Conference in Washington in 1915, this third person being a citizen of the United States.

The function of this Commission of Public Credit is to examine, classify, and consolidate the Nicaraguan debt by using the unexpended moneys remaining from the purchase of the canal option rights under the treaty with the United States and a reasonable amount of internal bonds. This commission will also make agreements with creditors when this method is necessary and is for the mutual advantage of both parties.

According to the financial plan, the National Bank of Nicaragua shall be a depositary of the funds (general revenues) of the Government, and all payments made by the Republic shall be by check or draft of the Minister of Finance or of such deputy as he may appoint for that purpose, and shall specify on their face the particular budget account against which they are drawn, and no checks nor drafts shall be drawn except as thus produced. All checks or drafts paid by the bank shall be retained by it and shall be vouchers for and conclusive proof of the payments to which they respectively refer. The bank shall open a separate account for each item of the budget, and if the funds to the credit of such account shall be sufficient, shall honor checks or drafts against it up to an aggregate amount not exceeding the amount of such respective item; but, except as thus expressly provided, the National Bank shall not be obligated to inquire into the correctness of such payments nor into the powers or authority of the person who may from time to time act as Minister of Finance or of the Government by him represented, and all payments made in good faith upon checks or drafts drawn by such Minister of Finance or by his deputy shall be full protection to the bank.

Brown Bros. & Co. and J. & W. Seligman, bankers of New York City. connected with the Mercantile Bank, signed a contract on September 1, 1911, with the Government of Nicaragua which gave them the right to establish the National Bank of Nicaragua.

RAILWAYS.

There is only one railway line of commercial importance in Nicaragua. This is the Pacific Railway of Nicaragua, which has its Pacific terminus at Corinto, on the Pacific Ocean. A large portion of the line was built during the eighties and nineties, the entire system being completed in 1903. The construction cost of the first 90 miles of road, completed between 1883 and 1886, was $2,005,584, this sum including the cost of some small river and lake steamboats.

After leaving Corinto the railway follows the Pacific coast in a northwesterly direction for a short distance and then strikes northeasterly to Chinandega. Leaving that city the line abruptly turns in a southeasterly direction, running to Leon (the largest city in the Republic), Managua, Granada, and Dinamba, the total mileage being approximately 163. In 1912 a company was formed to reorganize and take over the road, 51 per cent of the stock to be held by American bankers and 49 per cent by the Republic of Nicaragua.

Part of the proceeds of the Government loan of 1909 were, it was expected, to have been used to construct a line from Lake Nicaragua to the Caribbean Sea, opening to the outside world a large tract of more or less valuable territory and providing a means of outlet to Atlantic ports for the products of the western uplands. The distance from Lake Nicaragua to the port of Greytown on the Caribbean Sea is not more than 75 miles. The construction of this line and the improvement of the port of Greytown would prove of inestimable benefit to the Republic and would do much to restore its former prosperity.

Several other railway schemes to open up eastern Nicaragua have been talked of and a number of lines wholly or partly surveyed. It is presumed that the International Railways of Central America will eventually link up with the existing Pacific Railway of Nicaragua, and will then be carried through to Costa Rica and possibly Panama.

PUBLIC UTILITIES.

Some steps have been taken in the development of public utilities. Managua, the capital, Leon, Granada, Corinto, Chinandega, and a few other places have electric lighting systems presumably adequate for their respective needs, although further opportunities will doubtless arise from time to time. Approximately 806 miles of telephone lines have been laid out in the Republic, and there are 30 stations. The telegraph lines (which, together with the telephone lines, are operated by the Nicaraguan Government) cover 3,637 miles, and there are 130 offices.

MINING ENTERPRISES.

The mineral development of Nicaragua is likely to assume considerable importance in the future. Gold is the most important mineral mined at present. A very small amount of copper is produced as a by-product from the smelting of silver ores. Copper has also been located on the Caribbean coast and along the Mico and Escondido Rivers. Very promising belts have been located in the Department of Segovia (near the Honduras boundary), but development is almost impossible owing to the rough nature of the country and the general lack of means of transportation. Copper has also been found in the Departments of Leon, Zelaya, and Matagalpa.

Gold is found in the Pis Pis mining district and elsewhere in the Republic. In November, 1914, the Tonopah Mining Co., a large American concern, acquired a majority of the $1,000,000 stock of the Eden Mining Co., controlling 9 square miles in the Pis Pis district. A fair amount of development and construction work has been carried on, and it was expected that ore shipments would begin during the year 1917. Net average values of ore were reported to be $13 to $15 per ton, with mining and milling costs less than $6 per ton. The electric power is obtained from the Tunkey Transportation & Power Co., which was organized to acquire and operate the power plant, railroad, and river transportation, the entire stock of the latter company to be held by the Eden Mining Co.

The Pis Pis mining fields are not readily accessible, and the establishment of transportation facilities will be of the utmost benefit to the entire district. The usual means of transportation at present are gasoline launches, canoes, and mules, the trip covering more than a week.

In addition to the Eden properties, the Tonopah Mining Co. has acquired 93 per cent interest in the Tonopah Nicaragua Co., organized to operate the Santa Rita mines, located some 30 miles from the Eden mines. A force of men was sent early in 1917 to clear the property, and it was expected that shipments would begin before the close of the year.

A British company known as the Nicaragua Development Syndicate, incorporated in 1900, is in control of several of the important mining properties in the Republic, these comprising the Santa Rosa mines, the Quilali mines, and the San Juan Talpaneca mines. The capitalization of the company is £14,885 ordinary and £21,112 10 per cent cumulative preference stock, on which no dividend is being paid. The company has done considerable development work but has not yet placed the mines on a profitable basis.

The Central American Mines (Ltd.), a British company incorporated in 1913, as a reconstruction of the Oroya Leonesa (Ltd.), holds the Leonesa, La Reina, and Español mines. The capitalization of this company consists of £150,000 shares of 5s. par value, of which £112,503 10s. has been paid up; also £35,000 6 per cent debentures, redeemable at par on November 30, 1917, and convertible into stock at par. A plan is said to be under consideration to place the properties in good financial condition. The mines are said to be extremely rich and to offer excellent opportunities for extensive development. The gross receipts for the calendar year 1914 were £38,379; for 1915, £47,193; and for the first nine months of 1916, £31,304. The treatment plant was shut down during part of the period under discussion and all available efforts were concentrated on development work. The Oroya Leonesa (Ltd.), which this company succeeded, was registered in Great Britain during the year 1910. A battery of 20 stamps, together with cyanide and slime plants, are owned.

In addition to the mines here described there are a number of gold properties, more or less valuable, some of which are producers. There are also some silver mines, but these are mostly small and of little importance. Mining claims are not difficult to obtain in the Republic and water-power rights are readily granted. A mining claim consists of approximately 12,335 acres, and a moderate monthly rental is payable. There is an export tax on gold amounting to 48 cents per ounce.

AGRICULTURE.

As previously stated, the United Fruit Co. owned, at the close of 1916, 170,882 acres of unimproved land in Nicaragua, the company not being actively engaged in that Republic. At the same time the Atlantic Fruit Co. held about 125,000 acres of land. Individual planters of bananas are fairly numerous in the country, the exports of the fruit in 1914 amounting to more than 1,500,000 bunches.

Sugar cane is grown in the Departments of Chinandega and Leon, the largest property being owned and operated by the Nicaragua Sugar Estates (Ltd.), which company, according to a statement of Special Agent Garrard Harris, of the Department of Commerce, produced 4,800 tons in 1913 and 4,000 tons in 1914. There are several other estates producing from 100 to 800 tons per annum and a number of smaller producers. Prospects for the development of the sugar industry are said to be excellent.

Coffee is the principal agricultural product of the country and forms the bulk of its exports. Large portions of the western section of the Republic are suitable for coffee growing.

Coconuts, cacao, cotton, rubber, and a few other products are raised and exported in a moderate way, and there are sufficient cereals for the needs of the inhabitants. Methods of cultivation, although improving, are crude. The country as a whole is primarily agricultural and will continue so for a considerable period.

CATTLE AND OTHER LIVE STOCK.

The cattle industry bids fair to assume considerable importance in the Republic. Small but hardy animals are raised, and there is a good market for the beef at home and in Costa Rica. The possible construction of a railway at some future date would facilitate transportation to the latter Republic. Most of the cattle are ranched in the western section of the Republic, particularly in the Departments of Chontales, Matagalpa, and Jinotega. Endeavors are being made, through the importation of high-class stock, to improve the general breed. There is plenty of good grazing land available.

Sheep are also raised in the Republic, but not in very large numbers. Practically none of the animals are exported. A few horses are also raised.

FOREST PRODUCTS.

Despite the fact that Nicaragua contains almost every variety of hardwoods and a vast amount of timbers of other descriptions, there is only an extremely small number of sawmills, all small and crude. The expansion of the timber industry, needless to say, awaits better transportation facilities. In 1914 mahogany was exported to the approximate amount of $430,000 (10,127,000 feet), this indicating the possibilities of the industry under better conditions than now exist.

MANUFACTURING.

Very little development has been carried out in manufacturing. A few small ice factories, perhaps a dozen sawmills, some furniture and cabinet-making establishments, a bottling plant or two, and a few small hat factories form the bulk of the manufacturing concerns.

FOREIGN CAPITAL INVESTED.

The amount of foreign capital invested in Nicaragua has thus far not been large. Great Britain, holding probably more than £1,000,000 of the Government loan and a number of mining properties, has perhaps the largest interests in the field. The United States, with banking, agricultural, mining, and other enterprises, is probably next in order, while a small amount of German capital has been invested in coffee plantations and other industries.

PANAMA.

INTRODUCTION.

The Republic of Panama comprises the isthmus of the same name, with the exception of the narrow strip bordering the Panama Canal and officially known as the Canal Zone. The area of the Isthmus is 32,380 square miles, and the population in 1912 was 341,090. The Republic is traversed by mountain ranges, and its climate varies, according to altitude, from torrid to temperate. The rainfall throughout the Caribbean coastal region is considerable, sometimes exceeding 150 inches per annum. The average rainfall for the Pacific slope is much lower, seldom exceeding 65 inches per annum.

Panama City, the capital and Pacific port, has an estimated population of 60,028, while Colon and Cristobal contain approximately 29,000 inhabitants. The other cities of the Republic are not large: David, the capital of the Province of Chiriqui, has about 6,000 people and the Atlantic (Caribbean) port of Bocas del Toro approximately 3,500.

According to the statement of the Panamanian Government published in 1914, the total valuation of private property in the Republic was $33,175,501, of which $17,487,469 was in Panama City and Province. Of the total, $18,791,907 represented houses, $5,730,290 lands, and $4,705,125 cattle and horses.

The foreign trade of Panama for 1916 amounted to $14,704,179, as compared with $12,279,470 for 1915. The imports for 1916 amounted to $9,197,454 and the exports $5,506,725. Of this total trade, about 85 per cent was with the United States. Agricultural products formed the bulk of the exports.

NATIONAL DEBT.

According to the report of the Secretary of the Treasury of the Republic of Panama, the total outstanding liabilities on September 30, 1916, were $6,755,443. The expenditures for the calendar years 1917 and 1918 were estimated at $7,198,170, and it is stated that the estimated receipts of the Republic would be sufficient to provide for these expenditures.

Practically all of the external obligations of the Republic are held in the United States. The National City Bank of New York arranged in 1914 to take an issue of 5 per cent 30-year gold bonds, at 97, as issued. A large proportion of the proceeds was to be used for the construction of the Chiriqui Railway (see p. 439), running from Pedregal on the Pacific coast to the Boquete coffee district. The maturity date of this issue is March 1, 1944, interest is payable May and November, and bonds are retireable through sinking fund at 102½. The Government of Panama may call the issue at 105 and interest. There has been issued $2,250,000 of these bonds.

In 1915 the firm of Lawrence Turnure & Co., of New York, issued, in behalf of the Government of Panama, $1,200,000 5 per cent secured serial gold bonds, maturing $130,000 December 1, 1917, $130,000 annually thereafter including December 1, 1924, and $160,000 December 1, 1925. Interest is payable June and December, and the issue is secured by the income from the $6,000,000 constitutional fund of the Republic, which is invested in New York real estate first mortgages. The net revenue from this fund for the year 1915 amounted to $256,160. No additional bonds may be issued against this fund as long as this particular issue is outstanding.

There is also outstanding an issue of $1,250,000 12-year 5 per cent bonds, dated 1916 and due 1928.

RAILWAYS.

The most important railway on the Isthmus is, of course, the Panama Railroad, owned and operated in the interests of the United States Government, the holder of its $7,000,000 stock. The railway extends from Colon to Panama and owns extensive and valuable terminals in the two cities. The total track under the Panama Railroad control, not including canal construction tracks, was, as of June 30, 1916, 135.88 miles. The gross earnings from the railroad for the year ended June 30, 1916, amounted to $4,559,218, as compared with $3,014,864 in 1914–15, $4,567,406 in 1913–14, and $4,599,163 in 1912–13. Operating expenses for 1915–16 were $3,674,931 and net earnings from the railroad $884,287. Steamship earnings for the year totaled $3,341,279 and net earnings from that source totaled $1,004,373. Other income brought the total receipts of the Panama Railroad up to $2,532,616, and net income after all charges was $2,453,592, as compared with $914,861 in 1914–15, $2,303,340 in 1913–14, and $2,179,176 in 1912–13. The profit-and-loss surplus carried to the general balance sheet, as of June 30, 1916, was $19,341,483.

In February, 1914, the Government of the Republic of Panama gave a contract for the construction of a 53-mile narrow-gauge (3-foot) railway located in the Province of Chiriqui, to extend from the Pacific port of Pedregal to David, capital of the Province, thence to Boquete, with a branch from David to La Concepcion. Although operating expenses were not earned during the earlier periods of operation, it is expected that the railway will greatly aid in the development of the rich interior of the Republic.

The United Fruit Co. owns or operates a large mileage, mostly radiating from the Caribbean port of Bocos del Toro. These lines were constructed primarily for the banana trade, but handle a limited traffic in passengers and public freight. The total mileage of railways operated in Panama by the United Fruit Co., as of September 30, 1917, was 270, in addition to which 19 miles of tramways were in use. Locomotives in service numbered 36, railway cars 590, and tramway cars 24. The cost of the railways owned by the United Fruit Co. in the Republic was $3,587,373 and of the tramways $12,916.

A concession was granted by the Government early in 1917, for the construction of a railway from the Chagres River to Almirante and other places in the Atlantic coastal region. The railway would, it is claimed, place Panama City and Colon in touch with a rich and productive section of the Republic.

The railway mileage in the Republic and Canal Zone, exclusive of tramways and construction tracks, totals about 460 miles.

PUBLIC UTILITIES.

The public-utility development in the Republic is largely confined to Panama City and Colon. The former place is the only one on the Isthmus containing a traction line. Both of the cities are lighted with electricity and gas and have telephones, good water, and other improvements.

The Panama Electric Co., an American corporation, was registered in 1914, as successor to the Panama Tramways Co. The franchises of the company are for 50 years from 1913, with renewal privileges. The road extends from Balboa to Ancon, Bella Vista, and Sabana, traversing Panama City, the total length being 10 miles. Twenty-nine cars are operated. About 2 miles of additional lines are planned.

The capitalization of the Panama Electric Co. consists of $1,500,000 stock ($2,500,000 authorized) and $1,050,000 first-mortgage gold 5 per cent bonds due 1944. A sinking fund of 1 per cent of the maximum amount of bonds issued will operate between 1920 and 1943. Interest is payable June and December, the bonds are a first lien on the entire undertaking, and the total authorized issue is $2,500,000.

The gross earnings of the company for 1915 amounted to $193,779; net earnings were $44,755; surplus after charges, $7,672. The credit balance to profit and loss as of December 31, 1915, amounted to $60,801.

The Panama-American Corporation, with a capitalization of $500,000, is operated in the interest of the Electric Bond & Share Co., of New York, its majority stockholder. The company controls the Telephone Co. of Panama, and also manufactures and serves electricity and ice. The original date of the incorporation of the company was 1904, and the date of the acquisition by the Electric Bond & Share Co. was 1916.

The Panama Gas Co., incorporated under the laws of Delaware and controlled by Philadelphia, Pa., interests (Starr & Reed), has recently established a gas works in the city of Panama, and will supply without competition all gas for light, heat, fuel, and power in the city. The capitalization of the company consists of $500,000 stock, par $25, and $700,000 first-mortgage 6 per cent bonds due November, 1935, interest payable May and November, and secured by a first mortgage on the entire undertaking.

The Colon Gas Co., under management similar to that of the Panama Gas Co., furnishes gas for lighting, fuel, power, and heat to the city of Colon. The company has outstanding $250,000 stock, par $25, and $400,000 first-mortgage 6 per cent bonds due May 15, 1935, interest payable May and November. The bonds are a first lien on all properties and franchises.

An electric lighting and power service was inaugurated at Penonome early in 1918. A water system for the city is also planned.

AGRICULTURE.

Panama is primarily an agricultural country, its most important products being bananas and coconuts. The United Fruit Co., whose principal headquarters are at Bocas del Toro, had invested to September 30, 1917, $7,392,735 in tropical plantations and equipment. The lands of the company in Panama were carried at a valuation of $905,976, the houses and buildings owned at $769,610, cultivation of lands at $1,238,878, and live stock at $100,715 (see also "Railways"). The amount of improved land owned by the company in Panama was 35,943 acres, and the unimproved acreage totaled 88,298. Of the developed land, 28,288 acres were under bananas, 3,508 under cacao, 788 under coconuts, and 2,246 used for pasturage, the company owning 1,492 head of live stock.

The coconut industry seems to have attracted considerable attention in the Republic. There follows an article prepared by Mr. C. M. Brown and included in the general summary of conditions in Panama by Consul General Alban G. Snyder, Panama City, June 1, 1917:

> Most of the coconuts grown in the Republic are found along the Palenque and San Blas coasts on the northern or Atlantic side of the Isthmus, from which region the annual exportation is about 15,000,000 nuts. The plantations belong to small owners, as a rule, and no cultivation is practiced except machete cleaning at different times. The coconut is the main source of livelihood of the San Blas Indians, who own many trees. One large American plantation on the Palenque coast, now coming into bearing, consisting of more than 50,000 palms and owned by the Colon Coconut Co., is the only large development in that section.
>
> At Coco Plum Point, near Bocas del Toro, the Franklin Baker Co., an American concern, intends to plant 300,000 palms, of which 100,000 have already been set out. Within the past two years the United Fruit Co. has entered the field as a planter of coconuts at Bocas del Toro on land formerly devoted to banana plantations. The Tropical Plantation Co. acquired in 1916 a small property near Bocas del Toro containing 15,000 palms just coming into bearing. This number is to be increased.
>
> Besides the Venado plantation, located within the boundaries of the Canal Zone and now the property of the United States Government, the development of the industry on the Pacific side of the Isthmus includes the plantations of the Boston-Panama Coconut Co., at Mariato. with 100,000 palms; J. Piza, near Remedios, 25,000; R. Arias, Palo Grande, 15,000; and Isaac Brandon & Bros., about 25 miles from Panama City, 10,000; all except the last named, which is called the Perequete, are not yet producing.
>
> This property, the Perequete plantation, is now being enlarged. During the past year a part of its product was used for making copra by sun-drying methods, and satisfactory prices were obtained.
>
> The coconuts grown on the Pacific side are known as the Choco variety and are larger on the average than those raised on the Atlantic side, although the San Blas and the Palenque are considered on the New York market as good sized, compared with the average coconut from the West Indies. Climatic conditions in Panama are particularly favorable for coconut growing, and in normal times there is adequate and cheap water transportation to the northern markets. High freight rates and lack of shipping facilities due to the war have hindered the development of coconut planting in this country, but the outlook for the industry is bright. The new uses to which coconut oil is being put in the United States have stimulated prices there.

The total value of coconuts exported in 1916 was $718,280, as compared with $251,086 in 1915. The number of coconuts shipped was 17,873,324, as compared with 11,462,492 in 1915. Most of the exports were from Colon. There is said to be a very large acreage of coconut lands available in Panama and it is probable that the industry will show continued progress.

Cacao is being planted to a considerable extent, but the amount grown for export is still comparatively small. In 1916, 359,455 pounds of cacao, valued at $43,490, were shipped abroad. A large number of trees planted during recent years have not yet come into bearing.

During the later days of the construction of the Panama Canal a number of employees acquired agricultural areas, mostly located in Chiriqui Province. These areas were planted or were stocked with cattle. There followed a little land boom in the district and companies were formed with the object of attracting settlers. Owing to the fact that some of these enterprises were of the get-rich-quick order and that others, although honestly financed and managed, attracted a class of settlers wholly unfamiliar with tropical farming, many of the undertakings have failed and in some cases settlers were returned to the United States at the expense of the American Government.

Many of the farmers who have come to Panama have made money, however, and the agricultural areas of the Republic are capable of considerable development. The Government of Panama is lending every possible aid to settlers.

CATTLE RAISING.

The cattle industry in Panama shows promise, there being upward of 50,000 of the animals throughout the Republic. Breeding cattle may be imported free, and every effort is being made to extend the industry. There is a large amount of good cattle land in the country, and it is probable that nearly one million animals could be readily sustained. As the industry expands there will be room for the establishment of packing houses, and in 1916 legislation was passed with the view of establishing slaughterhouses and refrigerating plants, the Panamanian Government agreeing to waive all duties on machinery and needed supplies, as well as all taxes for a period of 20 years, and agreeing furthermore to give grants of land of from 1,000 to 1,500 hectares (2,471 to 3,707 acres) to those engaged in cattle breeding.

MINERALS.

Panama is not without mineral wealth, as gold exists and is mined, while silver, lead, aluminum, and asbestos have been found in various locations. Copper and coal have been located near Bocas del Toro and Golfo Dulce, salt near Aguadulce, manganese at Nombre de Dios and elsewhere, lignite on the Canal Zone, and iron in varying quantities in many places throughout the Republic.

Gold was mined in Panama before the Spanish Conquest, and to-day a certain amount of mining is carried on in the Darien Province, not far from the boundary with Colombia. Gold also exists in the Province of Veraguas and small amounts of it are obtained annually. In the Province of Los Santos are old mines, among them the Guacimo at Las Minas, formerly operated by the Boston-Panama Mining Co., an American concern. A shaft was sunk at this mine and considerable effort made to develop it. Gold and copper were found. The mine is presumably idle at the present writing.

Manganese, which has been found on the Caribbean coast, has given promise of becoming the most important mineral in the Republic. Exports for 1916 totaled $328,684.

The existence of petroleum is known, and concessions have been granted to the Panama-Sinclair Corporation, an American company, to carry out exploitation work.

FOREST PRODUCTS.

The forest wealth of Panama is considerable, and its development has attracted attention among outside capitalists. A number of companies have been formed to cut hardwoods and lumber, but thus far the exports have been insignificant. The Darien district and other sections of the Republic are densely covered with standing timber, including mahogany, cedar, rosewood, and other valuable trees of varied descriptions. Lack of suitable means of transportation and high freight rates have greatly retarded the development of the industry, and the capital thus far invested has scarcely returned even a moderate amount of interest.

The timber industry is destined, however, to be of great future importance to the Republic. The standing trees are worth many millions of dollars. There are said to be no less than 1,000,000 laurel trees in Panama, some exceeding 100 feet in height. The espave, producing a wood not unlike inferior mahogany, exists in numbers estimated as high as 1,500,000, and the caoba tree, somewhat similar in character, is found in vast numbers, those in the Republic being worth, it is estimated, nearly $200,000,000. There is also a large evergreen tree known as the calaba, of which there is a great supply. Other valuable woods are plentiful.

Such forest products as tagua nuts and balata are gathered in fair quantities. The balata exported to the United States during 1916 was valued at $466,603 and the tagua nuts at $185,457.

SALVADOR.

INTRODUCTION.

Salvador, the smallest of the Central American Republics, occupies an area variously estimated at from 7,225 to 8,130 square miles, being comparable in size with the State of New Jersey. It is bounded on the north and northeast by Honduras, on the northwest by Guatemala, and on its other sides by the Pacific Ocean and the Gulf of Fonseca. Its population is about 1,254,000, and its capital, San Salvador, is a city of about 65,000 inhabitants. The Republic is mountainous, some of the peaks being volcanic, and topographically it may be said to be a succession of mountains, table-lands, and valleys. A number of streams, none of commercial importance, traverse the country.

DEBT AND FINANCES.

The external debt of Salvador is limited to an issue of 6 per cent bonds and a subsidy payable to the Salvador Railway (see p. 445). The 6 per cent loan was originally for £1,000,000 and was offered in British markets, during 1908, at 86 per cent. Through amortization the outstanding amount has been reduced to £756,900. The loan was originally issued to provide funds for certain important public works and to pay off internal obligations carrying a higher rate of interest. The annual sinking fund was at the rate of 2½ per cent, cumulative, and the bonds were secured by a first charge on the special customs duty of $3.60 United States gold per 100 kilos of imported merchandise and the duty of $0.40 United States gold per quintal (maximum 500,000 quintals) on the annual exportation of coffee.

Following the outbreak of the war, which brought about a financial crisis, the Government found itself unable to meet its sinking-fund requirements, although the February, 1915, coupon was paid in cash and arrangements were made whereby coupons due August, 1915, and subsequently to August, 1919, were to be funded into new 7 per cent bonds, the income tax on the coupons so funded to be paid up to 2s. 6d. on the pound by the Government of Salvador. Beginning August, 1919, the annual service of £85,000 per annum on the original loan is to be resumed, this sum to be placed first to the payment of interest on the funding bonds, then to the payment of interest on the original bonds, the balance to be applied until 1927 to the redemption of the funding bonds, the issue to be finally retired during that year. Beginning 1928 the sinking fund is to be resumed on the loan of 1908. The amount of the new funding bonds to be issued semiannually was stated to be £27,707. Interest on this issue is payable February and August.

The interest on the internal debt of the Republic, owing to the financial depression, was suspended in March, 1915. This internal debt amounted to approximately 7,679,296 pesos. In order to meet the deficit arising from the decrease in customs duties and other revenues, the Government voted for the establishment of an income tax, made various monetary and tariff reforms, and reduced expenses.

Salvadorean Government external and funding loans are quoted on the London Stock Exchange. A recent quotation (January, 1918) for the 6 per cent bonds of 1908 was 60 and for the funding bonds 78. The 6 per cent bonds may be said to offer opportunities for a semispeculative investment, inasmuch as a general improvement in conditions is being brought about.

The total debt of Salvador, as of January 1, 1916, was said to amount to 27,814,318 pesos.

BANKS.

The Republic has three local banks, the Bank of Salvador, the Occidental Bank, and the Banco Agrícola Comercial. All these banks have their head offices at San Salvador, while the Bank of Salvador and the Occidental Bank maintain branches at Ahuachapam, San Miguel, San Vicente, and Sonsonate. The capitalization of the three banks is about 6,000,000 Salvadorean pesos, and they are banks of issue. The Government has expressed its willingness to cooperate in the establishment of a foreign branch bank, which, it is stated, would greatly aid in the commercial, industrial, and agricultural development of the Republic. Ample business is stated to be available. There is a considerable business in making loans at favorable rates on coffee crops and for other agricultural purposes.

RAILWAYS.

THE SALVADOR RAILWAY.

The Salvador Railway operates 100 miles of railways in the Republic, the main line extending from Acajutla, the most important port, to San Salvador, the capital, 65 miles.

The capitalization of the company consists of £250,000 6 per cent noncumulative preference shares (par £10); £250,000 ordinary stock (par £10); £190,000 5 per cent prior lien debentures; £566,600 5 per cent mortgage debentures; £21,247 three-year deferred interest certificates.

The coupon on the 5 per cent mortgage debentures due August, 1915, was paid half in cash and half in deferred certificates; the February, 1916, coupon was paid wholly in certificates; August, 1916, and subsequent coupons were paid in cash or certificates.

In the years before the war dividends were regularly paid on the preference shares, although not always at the full rate. The ordinary shares also received frequent dividends, generally at a low rate. In 1911–12 and 1912–13 dividend payments were at the rate of 6 per cent and 2 per cent, respectively, on the preference and ordinary shares. No dividend payments were made from the profits for the year 1913–14. The Government allowed the company a subsidy of £24,000 per annum, to expire December 31, 1916. Owing to the effect of the war on the finances of the Republic, payments were suspended. The Government has agreed, however, to pay the company 5 per cent per annum on unpaid annual subsidies and to pay the subsidies at the rate of £2,000 per month following the termination of the war.

This company's ordinary shares were quoted January, 1918, at approximately 15s. per £10 share, as compared with £5 5s., the high price since 1911. Preference shares were quoted at 1⅝, as compared with 8½, the high price since 1911. Approximate quotations for the two classes of debentures were 89 and 42; high prices since 1911 on these two classes of securities were 102 and 87, respectively.

The Salvador Railway is the most important line in the country to-day. In normal years gross earnings amount to about $600,000, and there are prospects that, once normal conditions are restored, business will show a sufficient increase to take care gradually of the future loss of income that will follow the termination of the subsidy. The railway becomes the property of the Government in 1974.

The company formerly operated three small steamers in the Central American coastwise service; these were disposed of in 1915 to the Royal Mail Steam Packet Co.

INTERNATIONAL RAILWAYS OF CENTRAL AMERICA.

This company has been discussed at length in the chapter on Guatemala. The Salvador section, as completed, consisted on December 31, 1916, of 98¾ miles, while 18.6 miles additional were under construction and about 134 miles to be constructed. The completed section of the railway extends from La Union westward to Zacatecoluca, the center of a coffee-producing country. The railway crosses the country between San Miguel and Lempa at the foot of a chain of mountains on which are located extensive coffee plantations. At Lempa the river Lempa is crossed. At the beginning of 1917 construction work was being actively carried on beyond Zacatecoluca, the idea being to complete the line to San Vicente (15 miles) before the end of the year and to carry it on to Molineros, about 6 miles farther, early in 1918. This entire section will tap a very rich country, from which the railway has never heretofore received any traffic. San Vicente is a town of considerable size and importance.

From Molineros the line will be carried on to San Salvador, the capital (37 miles). This section will connect with further extensions that will carry the system to Santa Ana and thence to the frontier of Guatemala, where a section of the main system will be linked up and through train service established between important centers of the two Republics. A line will also be built to carry the La Union division (already constructed) to the frontier of Honduras, about 20 miles. In Honduras about 88 miles of road are to be built, between the Salvador and Nicaragua frontiers.

Earnings of the Salvador Division of the International Railways of Central America for four recent years have been as follows:

Years.	Mileage.	Gross earnings.	Expenses.
1913	62.5	$35,369	$62,425
1914	84.0	77,710	86,791
1915	97.5	123,882	113,697
1916	99.0	139,166	118,709

The cost of the Salvador Division, as carried on the books, as of December 31, 1916, was $1,600,365. Equipment in service as of that date consisted of 7 locomotives, 8 passenger-train cars, 97 freight-train cars, and 3 service cars.

PUBLIC WORKS AND IMPROVEMENTS.

In the memorandum furnished by the delegates for Salvador to the Pan American Financial Conference held at Washington in 1915 attention was called to certain proposed public works to be carried out whenever the monetary stringency could be relieved. Chief among these public works were the paving and laying out of a sewerage system in the municipality of San Salvador and in other cities. . Some of the paving work was carried out in 1913 and 1914, but was never finished owing to lack of funds. It is believed that the Government, municipalities, and Public Utilities Commission of the Republic would be willing to guarantee jointly the financing of these enterprises.

Another undertaking projected by the Government, which will probably not be carried out in the immediate future, is the construction of a line of railway to extend from the port of La Libertad to San Salvador, the capital, about 32 miles. A concession was granted to a British company, prior to the war, to carry on the construction of this line, but all work other than a small amount of preliminary surveys, etc., was suspended following the outbreak of the war and has not been resumed.

Other enterprises, mostly municipal public-utility works, have been projected, these likewise being held up owing to existing conditions. Following the return of prosperity to the Republic there will doubtless arise excellent opportunities for construction enterprises, and a large part of the work will doubtless be handled by American contracting concerns.

MINERALS AND MINING.

Salvador is not without considerable mineral wealth, developed and undeveloped. Copper ores are known to exist in the Department of Chalatenango, near the Honduran frontier, as well as near Melapan, in the Department of Santa Ana. Some attempts at mining copper in a small way have been made, but no extensive development has been carried on.

Iron, lead, silver, and gold are also found in Salvador. Probably the most important gold mine is operated by the Butters Salvador Mines (Ltd.). This property consists of 546 acres of gold-bearing land located near Santa Rosa. The company is under Canadian management, having been incorporated in the Dominion in 1912, with a capitalization of $750,000 (par $5). Dividends of $0.25 per quarter have been paid regularly since 1914, the January, 1915, dividend being accompanied by a bonus of $0.12 per share. Profits for 1914 (latest figures obtainable) amounted to $116,042, this being realized from ore sales amounting to $499,911. It is said that the ore reserves of this property are nearing depletion. Another important mine under the control of somewhat similar interests is the Butters Divisadero Co., capitalized at $750,000, owning gold and silver mines at Divisadero, Department of Morazan. This company was incorporated in 1905.

The increased price of silver will, it is expected, lead to renewed activity in this branch of mining.

Petroleum has recently been discovered in Salvador, and the field has attracted the attention of foreign capitalists. A company known as the Salvadorean Petroleum Co. has obtained a concession to work a deposit recently located on the Panalapa Plantation, in the Departments of Santa Ana and Chalatenango. British experts who have studied the petroleum fields of the Republic express the opinion that large quantities of the oil exist of a grade sufficiently high for industrial purposes, and that the industry is likely to expand rapidly.

AGRICULTURE—LIVE STOCK—FOREST RESOURCES.

The production of coffee is the staple industry of the Republic, forming usually four-fifths of the country's exports. Salvador, like Guatemala, is highly suitable for the cultivation of the product and no less than 215,000 acres are planted in coffee trees. As is the case in Guatemala, a number of foreigners (a large proportion German) have been attracted to the industry and good profits have usually been realized. The coffee crop has reached in recent years a total of more than 75,000,000 pounds. The Departments of La Libertad, Santa Ana, Ahuachapan, La Paz, Sonsonate, and Usulutan produce the bulk of the crop, the last-named Department usually occupying first place.

Sugar, although a minor crop, is occupying the attention of a number of planters. The Republic contains much land suitable for its growth, and it may in time become an important product.

Tobacco, indigo, rubber, rice, and chocolate are exported in small quantities.

Although Salvador is thickly populated and the amount of grazing country necessarily limited, the cattle industry has, nevertheless, assumed importance and the Republic has for some time past been an exporter (in a small way, of course) of hides and skins. Attention is being given to the breeding of better animals, although there is still room for improvement. There is a good local demand for the beef, although up-to-date killing and packing methods are hardly known.

There are large areas of the balsam tree in Salvador, these being found in a section of the coastal belt. These balsam forests are being exploited in a limited way. Mangrove also exists, principally in swampy sections of the lowlands and along the river banks. Mahogany, cedar, rosewood, and other hardwoods are found in the interior uplands—not in large areas, however, owing to the smallness of the Republic and the fact that a very large portion of the land has been cleared for agricultural purposes.

MANUFACTURING.

The industrial development of Salvador has been very slight. Such manufacturers as do business in the Republic have little up-to-date machinery and not much skilled labor. A local cotton mill does a good business and could probably increase its output, as the amount of cotton cloth purchased from abroad is rather large. There are shoe factories, turning out a fairly creditable article, small sawmills and furniture factories, roof and tile manufacturers, rum distilleries, and a few minor manufacturing industries that use little or no machinery, among these being soap and candle makers, clothing makers, etc.

Part 3.—THE WEST INDIES.

THE BAHAMA ISLANDS.

The group of islands known as the Bahamas contains about 4,466 square miles and a population of approximately 57,000. The islands, which are of coral formation, are numerous, some of them being uninhabited. The principal industries of the island group are timber cutting, sponge gathering, and the production of sisal hemp. The production and canning of pineapples, which are of an excellent variety, is also assuming importance as an industry, there being two canneries in operation, one of which is owned by an American company and the other by local capitalists. Practically all of the outside capital invested in the Bahamas is American.

The exports of sponges from the Bahamas now amount to practically $800,000 per annum in value, the islands now being among the world's greatest sponge producers. The business of sponge farming is quite successful and is encouraged by the Government, which, however, is taking measures to conserve the sponges and otherwise protect the industry.

Bahama sisal hemp, thanks to high existing prices, is bringing large returns to the planters engaged in the industry. This sisal is said to equal in quality that produced in East Africa and the East Indies and is claimed to be superior to that grown in Yucatan. Mills exist in the islands for the cleaning of the hemp, although a large portion of that shipped is hand cleaned. The value of the sisal shipped in 1915 was about $350,000, as compared with about $230,000 the year previous. Good results were also obtained in 1916. Practically all of the sisal goes to the United States.

A large American company some time ago obtained a concession to cut yellow pine on Abaco Island and has established a large plant at Wilson City, a town founded by the company itself. It is figured that enough timber exists to last for 70 years. About 70,000 feet of yellow pine boards are sawed daily. During the year 1915 the company milled 10,179,000 feet of yellow pine, about two-thirds of which (valued at $129,000) was exported to the United States. About 400 employees are on the pay roll of the company, which, in addition to cutting timber, owns a sawmill, ice plant, stores, etc., and a 14-mile railway, the only line in the Bahamas. Wages amount to about $150,000 per year.

BARBADOS.

INTRODUCTION.

The island of Barbados, British West Indies, is located in latitude 13° 4′ N. and longitude 59° 37′ W., being the most easterly of the Caribbees. It is approximately 21 by 14 miles in size, with an area of 166 square miles. The population is not far from 200,000, the island therefore being one of the most densely populated in the world. Bridgetown, the capital, on Carlisle Bay, has about 25,000 inhabitants, is lighted by electricity and gas, and has a tramway system, which is expected to be electrified shortly. The rest of the population of Barbados is in small towns and villages or in the country. About 70 per cent of the total area of the island is under cultivation, sugar being the principal crop. Barbados is not a Crown Colony, being administered by its own legislative authority.

British and local capital are predominant in Barbados. Most of the bonded debt of the island is held in Great Britain. The electric lighting plant is British-owned, as are a number of the sugar plantations. The local tramway line is an American enterprise. Canada has extended its banking facilities to the island and has also invaded the insurance field. Other insurance companies are British or local.

LOANS AND FINANCES.

As in the case of other British West Indian colonies, the debt per capita of Barbados is extremely small. The loans of the colony issued prior to December 31, 1916, have been as follows:

Loans.	Original issue.	Amount in sinking fund.
3½ per cent loan of 1895; interest March and September 15; issued to purchase waterworks from the Bridgetown Waterworks Co. and to extend the service	£375,000	£127,830
£3 8s. 9d. to £4 per £100 loan (1883–1904); interest January and July	60,000	30,100
3½ per cent public-works loan of 1908; interest January and July	12,000	
3½ per cent public-works loan of 1910; interest January and July	6,000	
4 per cent public-works loan of 1912; interest January and July	14,000	
4 per cent public-works loan of 1914; interest January and July	11,000	
4½ per cent school loan, 1916; interest June 30 and December 31	6,000	
5 per cent war loan repayment, 1917; interest June 30 and December 31	20,000	

All the loans have sinking-fund provisions. The 3½ per cent loan of 1893 is listed on the London Stock Exchange and held mostly in Great Britain (see "British West Indian Bonds as Investments"). The other loans have been generally floated in Barbados.

The debts of the various parishes of Barbados totaled £3,847 as of December 31, 1916. Only one loan has been issued in the form of debentures. This loan, which is the obligation of the parish of St. Michael, was originally issued (1880–81) to the amount of £19,000, of which £18,400 had been repaid to 1917. The interest rate is 6 per cent per annum, and the proceeds of the loan were used to erect an almshouse and to improve Queens Park, Bridgetown.

Most of the financing carried on by the colony of Barbados has been for the purpose of acquiring or developing productive public works. At the outbreak of war the colony borrowed, in the form of a bank loan, the sum of £20,000 and presented it to the Imperial Government for war purposes. The loan from the bank has been repaid from the proceeds of a 5 per cent loan issued early in 1917. Later in the same year a small loan at 5 per cent was also floated, the purpose being to develop the Barbados Light Railway. The war loan and the £6,000 school loan are the only obligations not issued for productive public works. The credit of Barbados is excellent, and revenues are generally considerably in excess of expenditures.

BANKS.

The banking facilities of the island are furnished by the Colonial Bank, which operates throughout the various islands of the British West Indies, and by the Royal Bank of Canada. The former institution issues currency in Barbados, which is acceptable as legal tender. The bank is capitalized at £2,000,000, in shares of £20, of which £600,000 (£6) is paid up. Reserve funds amount to £150,000. Twenty-one branches are located in the West Indies or British Guiana. The Government operates a savings bank which is well patronized. The Barbados Savings Bank on March 31, 1917, had 13,110 depositors, with £450,149 to their credit. The interest rate is 3 per cent, and deposits are guaranteed by the Government.

RAILWAYS.

There is at the present time one steam railway in Barbados, a narrow-gauge road about 25 miles in length, extending from Bridgetown eastward through the parishes of St. Michael, St. George, and St. Philip to the windward coast, thence northwestward to Bath (where Codrington College is located), Bathsheba, and St. Andrews. The railway is of 2-foot 6-inch gauge and laid with light rail. The operations of the line have been carried on with varying fortunes, and shortly after the outbreak of the European war traffic was suspended. In the early months of 1917 it was reopened by the Government to assist the sugar planters of central and eastern Barbados, freight service only being maintained. Passenger service was expected to be resumed during the summer. Formerly one to two trains a day were operated, the speed maintained not exceeding 15 miles an hour. The road and equipment at this writing are not in the best state of repair. The railway could readily be acquired by responsible parties, and there are many who believe that with the construction of an extension from Bridgetown northward along the leeward coast to Speightstown (12 miles) the line would pay. However, the excellence of the roads throughout Barbados, the introduction of numerous automobiles, the lack of manufacturing industries, and the smallness of the island do not afford many hopes of large returns. There are at the present time 12 stations on the railway. The former fare between Bridgetown and St. Andrews was 2s. 6d. ($0.61) first class and 1s. ($0.24) third class. The price paid by the Government for the line was £20,000. A subsidy of £2,000 per annum was formerly paid to the previous owners.

PUBLIC UTILITIES.

Barbados is comparatively well supplied with public-utility enterprises. Bridgetown and its suburbs have an excellent water supply, telephone service, electric lighting and gas, and a dozen miles of tramways. Some of these services are extended to various other parts of the island.

The water supply of the island was formerly operated by the Barbados Water Supply Co. and the Bridgetown Waterworks Co. Both companies were acquired by the Government a few years ago and the service was extended throughout the various parishes. The Government, in order to make these purchases and extensions, effected the loan for £375,000 mentioned under the head of "Bonded debt." There are five important reservoirs, two with capacities of 1,000,000 gallons and upward. The entire island is piped, and there are standpipes at comparatively short distances apart.

The Barbados Electric Supply Corporation (Ltd.) is the concern supplying Bridgetown and suburbs with electricity. A description of the company is given in the Appendix (p. 533). There are more than 1,000 consumers for the electricity, and the company has the contract to light a portion of the city as well as the wharves, etc. Despite the curtailment of this public lighting on account of the war, the earnings of the company are growing steadily and it is anticipated that a fair profit will soon be earned. The shares of the enterprise are held in Great Britain.

The street railway service for Bridgetown and its suburbs is furnished by the Barbados Tramways (Ltd.), controlled by an American company. This line, at the present writing, is operated by means of mules, although before the outbreak of the war plans were made for the electrification of the system. Rails and other supplies were purchased, but the inability of the company to obtain certain necessary construction equipment compelled the temporary suspension of the work. The main line extends from Bridgetown to Hastings and St. Lawrence, 3 miles, and there are approximately 5 miles of other lines. Dividend rates on the company's stock are said to be 12 per cent per annum. The fare charged is 2 cents per half mile.

Gas and telephone services are maintained by local companies. The Barbados Telephone Co. had, it was recently stated, approximately 825 subscribers. Between 8,000 and 10,000 calls are handled daily. The total length of line in use is about 2,230 miles. The Barbados Gas Co. (Ltd.) supplies the gas that is used by a comparatively large number of consumers. The gas works are located at Bridgetown.

AGRICULTURE.

Sugar cane is the staple product of the island. The whole economic structure of Barbados is built around the sugar mill and plantation, and the ebb and flow of prosperity is almost wholly dependent on the ruling price of this product. The entire island is dotted with sugar mills, and fields of cane may be seen everywhere. The annual average crop is 50,000 tons, and this has been steadily maintained except in years of drought. The ruling high price of sugar during 1916 and 1917 has brought back some of the past prosperity to the island. On various occasions during past years the cost of production exceeded the value of the crop and fears were expressed that the industry would be ruined. Changed conditions have greatly encouraged the planters and the future is looked forward to with optimism.

There are no Crown lands available for settlement in Barbados, and the intending settler or investor in sugar lands must purchase these lands privately. Labor is fairly plentiful and cheap, and the excellent system of roads, together with the railway, enables the planter to handle the product to market without great expense. During recent years the production of sugar has been as follows:

Years.	Hogsheads of sugar.	Puncheons of molasses.
1871	52,800	35,500
1891	50,547	32,521
1901	65,010	46,042
1906	58,863	61,398
1909	17,795	69,036

In 1914, 1915, and 1916 the sugar exported amounted to 29,424 tons, 29,927 tons, and 55,452 tons, respectively. The value of the sugar exported in 1916 was $5,355,622. In 1916 99,062 gallons of rum were exported, valued at $44,193. The exports of molasses in 1916 totaled 9,816,015 gallons, valued at $2,655,036.

Sugar estates number 320, of which 107 have steam works. There are four rum distilleries.

Barbados is well suited for cotton growing, and a certain amount is raised annually. In 1916 137,718 pounds of raw and 5,305 pounds of linters were exported, valued at approximately $48,000, as compared with $83,640 in 1915. There are two cotton factories in the island. Coconuts and fruits are grown in abundance, but are mostly used locally.

MINING.

There is a manjack mine at Springvale, St. Thomas. Thirty-six persons are employed. A limited market for this product exists in the United States, the exports from the mine in 1916 amounting to $5,339. Lime and limestone are quarried and frequently used for building purposes. A total of 29,037 bags of lime, valued at $7,090, and 2,449 tons of limestone, valued at $1,489, were exported in 1916.

Traces of petroleum exist, and the oil has been prospected for.

MANUFACTURING.

In addition to the gas and electric lighting plants, there are eight factories in the colony, including two cotton factories, two ice plants. two biscuit factories, one manure and chemical works, and one tobacco and one cigar and tobacco factory.

GUADELOUPE.

Guadeloupe, the largest island of the French West Indies, has an area of 722 square miles and a population of about 186,000. About one-fourth of the island is under cultivation, about one-half of this being for sugar, one-ninth for coffee, and the remainder for vanilla, limes, vegetables, etc. All industries of the island are closely related to agriculture in its various branches. The soil is extremely fertile. About five-sixths of the exports consist of sugar and its products, one-tenth of cacao, and about 7 per cent of coffee. The coffee of Guadeloupe is among the very finest produced and brings a very good price in the markets of France. Coffee planters throughout the island have, for the most part, enjoyed considerable prosperity during recent years. The cacao crop usually exceeds $500,000 in value, and is mostly exported.

Guadeloupe has outstanding three loans (par 500 francs) originally issued as follows: (1) 3½ per cent loan of 1898, final date of payment 1924 through sinking fund, original issue 1,200,000 francs; (2) 3½ per cent loan of 1901, payable 1926 through sinking fund, original issue 1,500,000 francs; (3) 4 per cent loan of 1908, 1,000,000 francs, payable 1933 through sinking fund. The three issues were quoted in Paris in May, 1918, at 424, 421, and 500 francs, respectively.

There are no transportation facilities on the island other than automobiles and carriages. Water and lighting facilities are presumably ample.

Two banks exist in Guadeloupe, one of which, the Bank of Guadeloupe, is quite important. This bank has a capitalization of 3,000,000 francs, and, at the close of 1915, had deposits amounting to 2,900,639 francs. Loans and discounts totaled 5,144,786 francs, and notes in circulation 8,178,720 francs. The total deposits as above showed an increase of approximately 1,000,000 francs as compared with 1914. The bank's profits for 1915 were, however, less than in previous years, and the dividend rate for 1915 was only 2½ per cent as compared with 4 per cent the year before. In 1916 the rate was again 2½ per cent, and in 1917 it was 5 per cent. The 500-franc shares of the bank were quoted in Paris in May, 1918, at 425 francs.

The other bank in Guadeloupe is known as the Bank of Commerce. Its capitalization as of December 31, 1915, amounted to 300,000 francs.

JAMAICA.

INTRODUCTION.

Jamaica, Great Britain's possession among the Greater Antilles, has an area of 4,192 square miles and a population of approximately 850,000 (831,383 in 1911). About 20,000 of the inhabitants are classified as white. Kingston is the capital and largest city. Its population is upward of 60,000, and it has street railways, electric lighting, and an ample water supply. The island is largely mountainous, as high an altitude as 7,000 feet being reached.

The principal resources of Jamaica are agricultural, although there is much forest wealth and a number of deposits of minerals. Small streams, only a few of which are navigable even for rowboats, abound, and, with the ample rainfall, are of great importance to the farms and estates. The foreign commerce of the island is rather large and the United States is its best customer. The trade for 1915 and 1916 was as follows: 1915—Exports, $10,845,796; imports, $11,326,578. 1916—Exports, $13,729,537; imports, $15,120,236.

FUNDED DEBT.

A very large portion of the bonds issued by the colony of Jamaica are held in Great Britain and quoted on the London Stock Exchange. The important external loans of the colony are the following:

Loans.	Original amount.	Outstanding December 31, 1916.
4½ per cent debentures of 1879	£140,000	£2,300
4 per cent debentures, 1881-82	892,000	39,500
4 per cent inscribed stock, 1892	1,099,048	1,099,048
3 per cent inscribed stock, 1897	200,000	200,000
3½ per cent inscribed stock, 1900	1,493,600	1,493,600
	3,824,648	2,834,448

The total public debt of Jamaica, as of March 31, 1915, was stated as £3,854,305, as compared with £3,735,675 as of March 31, 1905. The amount of government loans expended on public works producing revenues totals £3,081,715. Interest and other charges on account of the public debt, for the year ended March 31, 1915, amounted to £194,172 (£189,170 in 1904–5). The revenues from taxation and other sources in 1914–15 amounted to £1,154,706 (£889,992 in 1904–5) and expenditures totaled £1,221,939 (£970,675 in 1904–5).

The balance of the outstanding 4½ per cent debentures of 1879 and the 4 per cent debentures were exchanged for the 4 per cent inscribed stock of 1892. The 4 per cent debentures were originally issued at prices slightly in excess of 97½ per cent, the average being about 98 per cent.

Of the 4 per cent inscribed stock, £918,948 was exchanged for the 4½ and 4 per cent debentures and £180,100 was sold at prices averaging in excess of 103½ per cent. Interest is payable March and September, and a cumulative sinking fund of 1 per cent that operates until 1934 will then retire the issue. The high price for this issue since January, 1911, was 105⅝, the price January, 1918, being 80.

The £200,000 3 per cent inscribed stock was publicly offered in 1897, the prices realized averaging about 100⅛. The high price since January, 1911, was 87 and the price January, 1918, was 59. Interest is payable January and July 1. A cumulative sinking fund of 1 per cent per annum will retire the issue by 1944, the government reserving the right, however, to retire the bonds in 1922, at par.

The 3½ per cent inscribed stock was issued in 1900 to the then holders of the Jamaica Railway bonds, the railway property being at that time transferred to the government (see "Railways"). Interest is payable January and July 24, and the principal is repayable at par on January 24, 1949, the government reserving the right to pay off the issue any time after January 23, 1919, on six months' notice. The high price for these bonds since January, 1911, was 97½; the price in January, 1918, was 67.

All payments on the government loans of Jamaica are made at the office of the Crown agents for the Colonies, 4 Millbank, Westminster, S. W., London, England.

BANKS.

The banking facilities of Jamaica are furnished by the British-controlled Colonial Bank, the Bank of Nova Scotia, and the Royal Bank of Canada. All these banks maintain branches in Kingston, while the Colonial Bank and the Bank of Nova Scotia have agencies at other important towns. In addition to the three privately owned banks, the government maintains a savings institution that is well patronized. There is no room at present for the establishment of additional banks in Jamaica.

The Colonial Bank, an important British institution, maintains branches in Barbados, Trinidad, and many of the Windward and Leeward Islands. The bank was incorporated in 1836 by royal charter. The subscribed capital is £2,000,000 in shares of £20, of which £600,000, or £6 per share, is paid up. Dividends paid during the past 12 years have been either 6 or 7 per cent per annum. Shares of the bank were quoted at £7 in October, 1917, comparing with £5¼ at the closing of the London Stock Exchange July 27, 1914. As of June 30, 1916, the bank carried reserves to the amount of £100,000; reserves for depreciation, £50,000; to be brought forward, £43,700.

RAILWAYS.

Jamaica is traversed by a system of railways operated by and under the control of the government. This line, with its branches, covers a very large part of the island and is of considerable importance. Formerly the railway was under private ownership, and its history dates back to 1843, when the Jamaica Railway Co. was formed by interests in the colony and England. The original prospectus was issued in 1844, the capitalization being placed at £150,000 and the par value of the shares being £5. The proposed railway was divided into three sections, and the estimated cost of the whole was to have been slightly more than £150,000.

The estimates, as made, were found to be far less than the actual cost, and the close of the year 1845 witnessed the completion of the railway only as far as a point a short distance beyond Spanish Town, the cost having exceeded £220,000.

No further construction work was carried on until 1867, when an extension was started with the idea of carrying the railway to Old Harbour, 11 miles beyond Spanish Town. This extension was opened in 1869, at a cost of £60,000. The railway as a whole did not flourish, and during 1879 the owners were glad to dispose of it to the government for the sum of £93,932. A number of improvements were made and new equipment purchased, bringing the total cost of the property to the government up to £201,260. Operations now became profitable, and it was decided in 1881 to build about 39 miles of extensions. These extensions were completed in 1885, the government having contracted a loan for £635,000 to cover the cost thereof.

During the period of the construction of extensions, surveys were made with the idea of carrying two extensions through, one to Port Antonio and the other to Montego Bay, the estimated cost to be £732,072 and £832,399, respectively. Shortly after the surveys were completed negotiations were entered into with an American syndicate, headed by Mr. Frederick Wesson, whereby the latter interests, paying the sum of £800,000, were to take over the railway and operate it. The £800,000 was declared payable £100,000 in cash and the balance in second-mortgage 4 per cent bonds. The purchasers agreed to extend the railway 12½ miles during the first year and a half of control and 12½ miles per annum thereafter, until the Port Antonio and Montego Bay lines had been completed. The company was privileged to authorize £1,500,000 first-mortgage bonds, £320,000 to be issued immediately and £200,000 on completion of each 25-mile extension. The government agreed to give one square mile of land for each mile of railway completed, and in fulfillment of this promise granted 116½ square miles of territory.

The American company took over the property in 1890, and completed the extension to Montego Bay in 1894 and the Port Antonio line in 1896. In 1897–98 interest was defaulted on the first-mortgage bonds, earnings having been below expectations. In 1900 the government gave its 3½ per cent inscribed stock in exchange for the outstanding first-mortgage bonds and again assumed control of the property. The land sold to the railway company was also repurchased for 5s. per acre, or a total of £18,500.

During 1914–15 the gross receipts of the railway totaled £179,381, as compared with £114,852 in 1904–5. Operating expenses in 1914–15 amounted to £107,265 (£89,915 in 1904–5). The net profit from operations during 1914–15 was £72,116, as compared with £24,937 in 1904–5. The cost of property to March 31, 1915, amounted to £2,666,725 (£2,476,128, Mar. 31, 1905). The total earnings on the capital investment amounted in 1914–15 to 2.7 per cent, as compared with 1 per cent in 1904–5. The average mileage operated in 1914–15 was 197½; the mileage since that time has been slightly increased.

The United Fruit Co. owns in Jamaica 16.39 miles of railway and 9.08 miles of tramways. Six locomotives, 78 railway cars, and 30 tramway cars are in service, the railways being valued at $99,838 and the tramways at $49,630. These short lines are operated primarily to handle the banana traffic of the company and are not really to be classed as common carriers.

There are practically no opportunities for the establishment of additional railways in the colony.

PUBLIC UTILITIES.

The West India Electric Co., incorporated in 1897 in Jamaica and controlled in Canada, handles the electric lighting business in Kingston, Spanish Town, etc., and operates the traction lines in and suburban to Kingston. The Jamaica Light & Power Co. is also owned. The original franchise was for 30 years, with renewal privileges for 20 years.

The capitalization of the company consists of $800,000 stock, on which dividends of 5 per cent per annum have been paid for a number of years; also $600,000 (full authorized issue) first-mortgage gold 5 per cent bonds due 1928, with interest payable January and July at the Bank of Montreal, and secured by a first lien on the entire property.

According to the balance sheet of December 31, 1916, property and plant were valued at $1,731,729, cash amounted to $203,666, and all assets were carried at $2,020,278. The surplus to profit and loss totaled $478,144. Of the liabilities, $100,000 represented contingent account.

There follows a statement of earnings and operating expenses:

Items.	1914	1915	1916
Earnings:			
Traction line	$206,870	$184,217	$195,602
Electric light	64,562	70,515	66,492
Power	9,780	11,714	12,958
Miscellaneous	7,713	7,872	11,270
Total	288,925	274,318	286,322
Operating expenses	155,229	143,368	144,065
Profit on working	133,696	130,950	142,257
Fixed charges	50,326	49,410	49,887
Surplus	83,370	81,540	92,370
Dividends on stock (5 per cent)	40,000	40,000	40,000

A tax of 4 per cent of gross receipts of railways is paid annually to the government, and a rental of $12,000 per annum is paid to the Jamaica Light & Power Co. Passenger cars in service total 44, passengers carried during 1916, 4,812,754, and mileage operated 26.

MINING.

There are numerous evidences of mineral deposits in Jamaica, but little has been done to develop them. Copper is said to occur near the middle of the island, the deposits showing veins of 3 to 4 feet in width. A small shipment of ore was made from this mine in about the year 1855, since which time several attempts have been made to form companies to develop the properties.

In 1907 the Jamaica Consolidated Copper Co., a Maine corporation, capitalized at $6,000,000, was organized to develop certain of the mineral properties described in the preceding paragraph. A total of 2,276 acres of land at May Pen, Clarendon, were secured. The prospectus of the company stated that "it is not general knowledge that the production of copper up to date from Haiti has been $300,000,000." Results from operations of the Jamaica property under the management of the American company are unknown.

AGRICULTURE AND FRUIT RAISING.

Jamaica, like the other West Indian islands, is primarily agricultural. Bananas, sugar and rum, cacao, coffee, coconuts, ginger, and tobacco are exported in large amounts. A factor of great importance in the fruit industry is the United Fruit Co. The investments of this company in Jamaica were valued, as of September 30, 1917, at $3,360,027, including land to the value of $1,035,349; houses and buildings, $535,329; cultivation, $744,563; live stock, $212,485. The acreage of improved land owned was 18,815 (16,419 on September 30, 1916) and of unimproved land 22,297 acres. In addition, 7,798 acres of improved and 13,642 acres of unimproved land were leased. The acreage under bananas amounted to 7,246, this representing about 8 per cent of the total banana acreage in the island. The area of United Fruit Co. lands under coconuts was 4,636 acres; 310 acres were under cacao, 15 under rubber, and 364 otherwise planted. In addition, about 13,826 acres were used as pasture land, the company owning in Jamaica 221 head of cattle, 936 horses and mules, and 131 miscellaneous animals.

As of March 31, 1915, 273,108 acres of land in Jamaica were under cultivation. A very large portion of the remainder was under timber. In 1915 the acreage planted with bananas was 85,854, with sugar 31,727, with coconuts 29,731, with coffee 18,750, with cacao 11,088, and with tobacco 881. It is a surprising fact that more tobacco is not raised for export. The quality equals that of the best Cuban tobacco, despite which fact cigars to the value of only $195,846 were exported during 1915, a slight increase over 1914. Inasmuch as many of these cigars were shipped to other British West Indian Islands, there would seem to be an excellent opportunity for a far wider distribution of the product into the United States and a possible chance for the investment of capital in this field.

The increase in sugar production and the better prices obtained have greatly encouraged the planters and it is believed that the industry will show continued improvement. About 566,620 hundredweight of sugar and 1,797,913 gallons of rum were exported in 1916, as compared with 302,885 hundredweight of sugar and 1,309,103 gallons of rum in 1915. There is a strong movement in Jamaica at present in favor of the development of the sugar industry by the establishment of central factories, which give promise of a bright industrial outlook for the future.

The Blue Mountain coffee of Jamaica is of a very superior quality, and the coffee planters of the island normally enjoy considerable prosperity.

A British concern known as the Jamaica Copra & Estates (Ltd.) was registered in 1913 to acquire and develop coconut properties in the island, to export coconuts, copra, etc., and to establish factories for the manufacture of copra. About 1,000 acres of land, situated not far from Port Antonio and containing about 22,700 trees, was acquired. The authorized capitalization of this company is £50,000, in shares of 5s. par, of which £23,882 5s. has been issued. The property at last accounts was still in its development stages.

FOREST RESOURCES.

There are upward of 400,000 acres of land in Jamaica under forest, exclusive of scrub land. There are numerous hardwoods on the island, including some mahogany, rosewood, satinwood, mahoe, and other species. Under conditions such as exist in Jamaica, where labor is fairly cheap and plentiful, it has been found that sawing the logs by hand is the most profitable method to be employed in the industry. There were, at last accounts, only two sawmills in the colony, one being the property of an American concern. The capacity of this mill, which is located at St. Margarets Bay, near Port Antonio, was stated to be 10,000 feet of lumber and 10,000 shingles per day. The other sawmill is located at Kingston.

The exports of dyewoods and their products, such as logwood, logwood extract, and fustic, are annually quite large and the industry is one of the most important on the island. In 1915 the exports of these dyewood products were valued at approximately $2,000,000. A dyewood extract factory is located at Spanish Town. This concern handles a very substantial amount of business annually. The British Dyes (Ltd.) also maintains a small factory at St. Elizabeth.

MANUFACTURING.

The following review of the slight development in the field of manufactures is reproduced from the monograph, "The West Indies as an Export Field," by Garrard Harris, special agent of the Bureau of Foreign and Domestic Commerce:

> Jamaica is not in any sense a manufacturing country. nor is there any probability that it ever will be. It is chiefly a producer of raw materials of an agricultural nature, and for many years its commercial life will continue to be based on the exportation of these products, with the island depending upon outside sources for most of its necessities.
>
> Kingston, the capital and principal city, has one match factory, one ice factory, two small ale and porter breweries, five aerated-water and "soft-drink" factories and bottling works, four cigar and cigarette factories, one fair-sized fancy-biscuit and cracker factory, a small saw and planing mill, and one tannery and leather factory that has begun the manufacture of shoes from native leather.
>
> Port Antonio has an ice factory, a soft-drink bottling works, two factories for turning coconut meat into copra, a tannery, and two small cigar factories.
>
> At St. Mary there is a small establishment designed to prepare bananas into "figs" or dried bananas, as well as "banana flour." As the principal market for these products was Germany, the business has been practically at a standstill since the beginning of the war. There is also a small brewery.
>
> At St. Anns Bay there is a small establishment for the extraction of essential oils, such as orange-peel oil, etc. There is also a coffee "beneficio," where coffee is prepared for export, as well as a small gristmill for grinding native corn.
>
> At Trelawny there is the Cassava Products Co., making starch, etc.

At Montego Bay one finds an ice factory, an aerated-water factory, and bottling works, and a small establishment making native wines and cordials.

At Savanna-la-Mar there are two aerated-water factories, a steam bakery, and another steam bakery operated in connection with one of the bottling works.

At Georges Plain there is a rice-treating plant; also a factory for extracting, treating, and bottling lime juice.

At St. Elizabeth the British Dyeworks Co. has a factory making dyes out of logwood, fustic, and the like.

At Manchester there is an aerated-water factory.

At Trout Hall, in the parish of Clarendon, there is an establishment for preparing bananas as "figs" and flour for export. It is doing a relatively small business on account of war conditions. The same concern also prepares cocoa for export. There is a similar factory at Aenon Town, in Clarendon Parish.

At Spanish Town there is a dyewood-extract factory, and at Linstead there is an electrical plant and ice-making company.

FOREIGN INVESTMENTS IN JAMAICA.

Although Jamaica is a British colony, the investments of the mother country in its enterprises are not large. Most of the capital from outside sources has originated in the United States and Canada. British investments are limited to a portion of the outstanding bonds of the colony, the branches of the Colonial Bank, and shares in some small land-development companies. The United States has become prominent in the field through the investments of the United Fruit Co. The Atlantic Fruit Co. also has land interests in the island, and there are other agricultural estates, together with forest properties, under American management. Canada has financed the local public-utility enterprise, the West India Electric Co., and also has established a number of branches of its banks. No other country has any interests of importance in the island.

The increased prices obtained for agricultural products have made Jamaica prosperous, and the improved conditions existing will doubtless prevail for a number of years.

THE LEEWARD ISLANDS.

INTRODUCTION.

The Leeward Islands, belonging to Great Britain, comprise Antigua, Dominica, St. Kitts-Nevis, Montserrat, the British Virgin Islands, and several islands of less importance. These colonies, long dormant following the collapse in the price of sugar due to the introduction of beet sugar into Great Britain, are showing indications of returning prosperity. They are healthful spots, possessing great natural beauty, and swept by the cooling trade winds. There are many opportunities in these islands for those inclined to follow agricultural pursuits in either a large or a small way, and many advantages present themselves that are not found elsewhere in the American Tropics. The outer West Indies are destined to enjoy better times, and this fact should not be overlooked. The several islands will be discussed individually.

ANTIGUA.

Antigua is located in latitude 17° 6′ N. and longitude 61° 45′ W. Its area is 108 square miles, or about two-thirds that of Barbados, and its population is about 32,000. The island has several harbors, the most important being at St. John, the principal town (population 10,000). This harbor is more than 2 miles in length and three-quarters of a mile broad, but is not of sufficient depth to provide entrance for the various mail steamers making the port. The anchorage is fairly sheltered, however, and cargo is landed in small sailing vessels. The town itself presents an appearance somewhat better than that of the average British West Indian town. The island has no rivers of importance and a somewhat lower rainfall than most of its neighbors. Droughts, however, are not frequent.

BONDED DEBT.

The debt of the island is extremely small, consisting of the following issues:

(*a*) Loan of £900 due Savings Bank.

(*b*) Four per cent debenture issue of 1890, for the laying out of a water system. There is a sinking fund of 1 per cent per annum provided for this issue. At present it amounts to approximately £5,300.

(*c*) Four per cent debenture issue for waterworks, £1,200. Sinking fund nearly equals that amount.

(*d*) Four per cent debentures of 1894, to the amount of £100,000. This is the most important issue of the island and was for the purpose of providing funds for public works and improvements, including harbor improvements. The sinking fund of 1 per cent per annum has accumulated upward of £38,000 for the ultimate redemption of the issue. The issue was quoted January, 1918, at 75–77.

Public revenues of Antigua average an amount somewhat in excess of £50,000 per annum, and expenditures are about the same. Savings-bank deposits total £47,553 (at 3 per cent). The banking facilities of the island are furnished by the Royal Bank of Canada and the Colonial Bank.

RAILWAYS AND PUBLIC UTILITIES.

There are no railways in Antigua or, in fact, in the Leeward Islands that are, properly speaking, common carriers. There are two lines between sugar plantations and factories, one operating 17 miles of 2-foot 6-inch gauge and the other 3½ miles of 2-foot gauge line.

There are no electric lights in the towns and no tramway lines on the island. Probably after the close of the European war, when the town and harbor are once more lighted fully, there will be opportunities for the establishment of a lighting system which will not require any extensive outlay of capital.

The government controls the water and telephone systems. There are approximately 195 telephones in use in the island, with 320 miles of wires. Earnings in 1915 were £928 and expenditures £866. Calls totaled 965,994. The water supply of St. John and some 15 other towns and villages is furnished from the Body Ponds and Wallings Reservoirs, and represents an outlay, including pipes, etc., of more than £40,000.

INDUSTRIES.

The development of Antigua along agricultural lines has been confined to sugar and, in a smaller way, cotton and pineapples. Antigua pineapples are famous throughout the West Indies, but their production is declining owing to the inability to secure ships properly provided with refrigeration and storage plants.

Sugar, the production of which showed a serious decline during the years of low prices, is again supreme in Antigua. There are 71 important sugar estates on the island, occupying a little more than half of the 18,411 acres of land under cultivation (total area of island, 69,275 acres). In the year 1915 the amount of sugar exported was 11,639 tons, valued at £133,788. Molasses to the value of £18,353 was also shipped. In 1914 the crop exported totaled 15,450 tons. The 1916 crop was far larger than that in 1915, and reaped the benefits of the prevailing high prices. The 1917 crop was slightly smaller than that in 1916. There are several excellent sugar factories on the island, one of which (Gunthorpe's Central Sugar Factory) has a number of shareholders both in the colony and in Great Britain.

When sugar prices declined a few years ago the planters of Antigua turned their attestion to sea-island cotton and produced an excellent quality of this. However, during recent years, the production of this article has steadily declined until 1917, when, owing to high prices, more attention was given to it.

DOMINICA.

Dominica has an area of 291 square miles and is located just north of latitude 15° and west of longitude 61°. The population of the island is only about 32,000, making it the most thinly settled of the various Leeward and Windward Islands. It is, however, the third largest of the British West Indies. The island is very mountainous, one of its peaks reaching an altitude of 5,000 feet; only in one section, the Layou Flats, is there any considerable area of flat country. There are numerous streams and small rivers and vast forest areas containing fine specimens of hardwood timber. Roseau, lying on an open roadstead on the leeward side of the island, is the chief town and port. Its population is approximately 6,000. Prince Rupert Harbor (also on the western side of the island), on which harbor the town of Portsmouth is located, would make a much better port.

BONDED DEBT.

Dominica has outstanding three small bond issues, as follows:

(*a*) Five per cent debentures of 1880 to the amount of £5,000, issued for public works. There is a sinking fund that has accumulated funds to the amount of approximately £3,300.

(*b*) Four and one-half per cent debentures of 1888, originally issued to the amount of £30,000 to defray costs of roads and bridges. Approximately £12,000 has been accumulated to the credit of the sinking fund.

(*c*) Four per cent bonds of 1895, originally issued to the amount of £30,000. The sinking fund has been accumulated to the amount of approximately £9,000.

All sinking funds are accumulative at the rate of 1 per cent per annum.

During recent years the revenues of the colony have generally exceeded expenditures, usually by a substantial amount. These revenues now amount to about £50,000 per annum. Savings-bank deposits total £19,882. These bear interest at 3 per cent per annum. The Colonial Bank has a branch at Roseau.

RAILWAYS AND PUBLIC UTILITIES.

The only railway in the colony is that owned by the Dominica Forests & Sawmills (Ltd.), which was constructed to bring lumber from the estate of that company (see Appendix, p. 533) to Portsmouth. This line is 3 miles in length and of 3-foot gauge. There is a coastal steamer that normally makes weekly trips touching at the various villages and ports of the island.

Roseau is one of the few cities or towns in these islands provided with an electric lighting system, the electricity being generated by water power from one of the numerous rivers.

There is a telephone system in Dominica, operated by the Government, which provides approximately 158 telephones. There are 305 miles of wire, and 286,779 calls were handled in 1915. The rate is £5 10s. per year, and the receipts for 1915 totaled £726 and the expenses £1,015.

A substantial municipal market exists at Roseau.

INDUSTRIES.

In the early days of Dominica the principal product was coffee. It is said that in the latter part of the eighteenth century no less than $30,000,000 worth of coffee was exported. Owing to blight, coffee planting was abandoned and attention turned to sugar, which in turn was abandoned following the decline in sugar prices. The growing of limes then became the foremost industry, and these to-day are the staple products of the island.

During 1916 shipments of limes and lime products reached the substantial figure of £151,927, despite the fact that a disastrous hurricane destroyed, it is estimated, 117,881 barrels. During this hurricane 106,298 trees were lost or blown down. The value of limes produced during the previous year (1915) was £174,404, this crop amounting to 390,000 barrels, as compared with 388,000 barrels in 1914, 391,000 barrels in 1913, and 370,000 barrels in 1912. These limes enjoy a fairly good market outside of the island, and there is demand for a large amount of bottled Dominica lime juice (concentrated).

Cacao comes next in importance to limes and is being cultivated in increasing amounts, despite the fact that the hurricane in 1916 destroyed more than 10,000 trees. Exports of the product have not, however, reached the figures attained by lime products, totaling £17,151 in 1916, which was considerably less than in 1915.

Coconuts are also grown in fair quantities, and nutmegs form a minor crop. The island is favored by a very heavy rainfall (it is said that rain falls every day in the year in the higher mountains), and it enjoys a rather pleasant and healthful climate. The annual death rate does not average more than 22 per 1,000. There are stated to be available in the island for settlement and cultivation approximately 100,000 acres of Crown land, payment for which, in comparatively large blocks, may be extended over a period of several years. There is an upset price of 10s. per acre on these lands.

Dominica is practically covered by forest growth, and many excellent varieties of hardwood and other timbers abound. Despite this fact, very little is being done in the way of developing this field. A few years ago a British company known as the Dominica Forests & Sawmills (Ltd.) (see Appendix, p. 533) was formed to develop extensive timber areas in the vicinity of Portsmouth. A grant of 25,000 acres was secured, but thus far little has been done other than the construction of 3 miles of railway, and the company has directed its attention to the raising of limes and lime products. There are certain difficulties in the way of getting the timber out of the forests, and fair-sized amounts of capital will be required in developing undertakings of this character.

The total value of the exports of Dominica for the year 1916 was £212,301 and of imports £208,197. This is more than double the foreign trade of 10 years ago, despite the fact that the population has remained almost stationary.

Dominica is an island that certainly offers opportunities for the establishment of plantations requiring fair-sized investments.

MONTSERRAT.

Montserrat, frequently spoken of as the "Emerald Isle of the West," lies about 28 miles to the southwest of Antigua. Its area is about 33 square miles and its population 12,500. The island is extremely healthful, the death rate not exceeding 16 per 1,000. Like most of the group, the island is mountainous, one peak reaching the altitude of 3,000 feet. Plymouth (population, 1,500) is the capital and chief port and town. It is situated on an open roadstead on the leeward or sheltered side of the island.

BONDED DEBT.

The debt of this little island consists of three small, unimportant issues—£10,000 4¼ per cent waterworks bonds of 1893; also £200 4½ per cent and £900 5 per cent debentures. Sinking funds on hand are equal to about one-third of this amount. The revenues of the colony, now in excess of £12,000 per annum, are greater than expenditures.

INDUSTRIES.

Sugar has lost its importance as a crop in Montserrat, and cotton and limes now occupy the foremost positions. Cotton was produced during 1915–16 to the amount of 279,575 pounds, as compared with 289,334 in 1913–14, the year before the war. Limes and lime juice are also exported in considerable quantities, although hurricanes have on two or more occasions greatly damaged the trees. The Montserrat Lime Juice Co., of Birmingham, England (see Appendix, p. 534), is the most important concern in this field operating in the island. This company has usually been a successful dividend payer. Its shares are registered on the London Stock Exchange.

Papain, a medicine made from the pawpaw, is exported from Montserrat. This island is noted for the excellence of its pawpaws, but, owing to the perishable nature of the fruit, little market exists for their sale except to passing ships. Coconuts and bananas are also raised but not exported to any extent.

There is a fairly large central cotton factory on this island, this and a lime factory being the only important industrial establishments.

There are no public utilities or railroads, other than a government-owned waterworks and supply.

Although, as has been indicated, the island is small and not fully developed, there are few spots in the West Indies more delightful or better suited for the growth of fruits, spices, vanilla, and other products of the Tropics. The sea-island cotton that has been produced is of a most excellent variety and a future is likely to be in store for the producers. Exports of the island, barring one or two interruptions due to storms, etc., have shown a steady, consistent increase. These exports are wholly confined to agricultural products.

ST. KITTS AND NEVIS.

The islands of St. Kitts and Nevis lie to the northwest of Antigua. Their combined area is 115 square miles and the population about 50,000. The two islands, of which St. Kitts is considerably the larger, lie about 2 miles apart, although their chief towns, Basse Terre and Charlestown, are about 15 miles apart. Anguilla, a small island, is a dependency of St. Kitts and Nevis. Its area is about 35 square miles, and a portion of it is fertile. Both St. Kitts and Nevis are very fertile islands, although quite mountainous, and cultivation is carried on up the slopes to an altitude of more than 1,500 feet.

FUNDED DEBT.

The bond and debenture issues of St. Kitts-Nevis are the following:

(*a*) Five per cent debentures of 1886, originally issued to the amount of £3,900; sinking fund, £1,900.

(*b*) Four and one-half per cent waterworks bonds of 1889, issued to the amount of £8,000; sinking fund, £3,900.

(*c*) Four per cent inscribed stock, issued for waterworks to the amount of £8,850, and 4½ per cent public-works bonds issued to the amount of £23,000. The joint sinking fund for these issues amounts to approximately £9,300.

(*d*) Four per cent debentures of 1891, issued to the amount of £23,500; sinking fund, £8,000 (approximately).

RAILWAYS AND PUBLIC UTILITIES.

There are no railways on the islands that are common carriers. In St. Kitts about 15 miles of lines exist, having been constructed to carry sugar cane to the Central Sugar Factory. The gauge of this line is 2 feet 6 inches.

There are no improved methods of lighting on either island. Presumably opportunity exists for the establishment of electric lighting at Basse Terre, following the termination of the war. At present, owing to the open nature of the harbor, but little street lighting is done. Basse Terre is somewhat better than the average British West Indian town and should readily support a small lighting company. Just previous to the outbreak of the war in 1914 arrangements had been about completed for the establishment of this lighting system. Basse Terre has a population of 8,200.

There is an excellent water supply on the island, under government supervision, as well as telephone service.

INDUSTRIES.

The largest and most important industrial enterprise of the island is the Central Sugar Factory, operated by the St. Kitts (Basse Terre) Central Sugar Factory (Ltd.), a British company. This is probably the best-equipped sugar factory in the British West Indies, and may truly be called a model in every sense. The plant was placed in operation in 1912, and during the five years of its existence has more than doubled its output. In 1917, 12,800 tons of sugar were turned out, an increase over the figures for 1916. The company is now on a dividend basis, and there is every prospect of a continuation of large returns. Probably 70 per cent of the sugar crop of St. Kitts and a portion of the Nevis crop is ground at this Central Factory. Fifteen miles of railway, docks, and other facilities are owned. A similar institution might profitably be established in Barbados.

The sugar exported from St. Kitts-Nevis during recent years has been as follows: 1901 to 1912, from 11,044 to 16,624 tons; 1913, 11,312 tons; 1914, 9,946 tons; 1915, 8,341 tons; 1916, 15,000 tons. In 1917 the exports were expected to be somewhat in excess of the 1916 figures, assuring a prosperous year for the colony. The acreage under cultivation for sugar in 1916 was computed at 7,541. This was less than the 1917 total.

The cultivation of sea-island cotton has attracted considerable attention among the planters of the two islands and their dependency, Anguilla. The exports for 1915 amounted to 736,471 pounds, of which 397,567 pounds were raised in St. Kitts, 305,154 pounds in Nevis, and 33,750 pounds in Anguilla.

The rainfall of St. Kitts in 1915 was 66.5 inches. The climate of the two islands may be called ideal, the death rate is astonishingly low, and the scenery and surroundings are beautiful. Nevis once had a white population of between 4,000 and 5,000 and contained many wealthy families. To-day there are less than 100 whites in the island, despite its beauty and potential agricultural wealth, and it is now only accessible by means of schooners and small sailing vessels running from Basse Terre. There are evidences that the island has seen its worst days and is likely to experience a period of steadily returning prosperity. For those liking the somewhat isolated life of the planter, there are no two more ideal spots than St. Kitts and Nevis.

The annual foreign trade of St. Kitts-Nevis is approximately $2,000,000.

BRITISH VIRGIN ISLANDS.

The Virgin Islands are the most northerly and the smallest and least important among the Leeward Island group. Their area is about 50 square miles and population about 5,700, mostly peasant proprietors. The annual foreign trade of the group is less than $100,000. The islands offer but few opportunities for the investment of foreign capital, although there are some splendid areas adaptable for the raising of coconuts. Some cotton is produced. The islands are outside the usual route of steamers, and most of the trade is carried on in small sailing ships. The islands have no bonds outstanding and no public utilities. Savings-bank (government) deposits amount to £300. A total of 1,225 acres of land are under cultivation.

SUMMARY.

The Leeward Island group has many attractions. Most of the islands are veritable paradises of natural beauty, and their soil is extremely fertile. Their only wealth, other than the timber of Dominica, is agricultural, and along agricultural lines there are certainly many opportunities. The long period of stagnation and depression that blighted the prosperity of these islands is at an end, and there seems to be every prospect that a general period of prosperity is at hand.

MARTINIQUE.

The island of Martinique, the most important of the French possessions in the Western Hemisphere, lies to the south of Dominica. The island's trade is generally far larger than that of most of its neighbors, its exports being consigned principally to France. This foreign trade for 1915 amounted to $12,884,179, as compared with $8,391,473 in 1914.

Martinique has outstanding two 3½ per cent loans, issued 1899 (1,460,000 francs) and 1917 (3,000,000 francs), payable through sinking fund 1924 and 1941. The loans were quoted in Paris in May, 1917, at 420 and 402 francs per 500-franc bond.

A French institution known as the Banque de la Martinique furnishes banking facilities for the island. Its capitalization is 3,000,000 francs; reserves June 30, 1916, totaled 3,255,022 francs. A dividend of 10 per cent was paid for 1916. The rate for 1917 was 20 per cent. The 500-franc shares of the bank were quoted at 705 francs in May, 1918.

Sugar reigns supreme in Martinique, and as a result considerable wealth is being brought to the island. The value of the sugar and rum exported during the years 1913 to 1916 has been as follows: Sugar—1913, $2,378,851; 1914, $2,328,060; 1915, $4,582,420; 1916, $5,143,103. Rum—1913, $2,234,205; 1914, $2,598,853; 1915, $2,904,818; 1916, $5,522,948. A small amount of other sugar products is also exported.

Increasing attention has been given of late years to the raising of cacao, coffee, vanilla, limes, and other tropical products. The lime industry has not been a real success thus far, although during 1914 and 1915 about 200,000 trees were planted. Inasmuch as limes grow prolifically in Martinique, there is every reason to believe that the industry is capable of development. The quality of coffee produced is most excellent, and the demand for the product in France has greatly exceeded the supply. During the past three or four years a considerable number of trees have been planted, although exports are still very small.

Cacao is second in importance to sugar, upward of 500 metric tons being exported during 1915. The value of the cacao exported was $238,606.

There are no important manufacturing industries on the island other than sugar factories. Automobiles and carriages furnish most of the necessary means of transportation throughout the island.

TRINIDAD AND TOBAGO.

TRINIDAD.

INTRODUCTION.

Trinidad, the most southerly island of the West Indies, has an area of 1,859 square miles and a population of approximately 340,000. It is rough and mountainous, containing large forest areas and numerous small unnavigable streams. Port of Spain, the capital, situated on the Gulf of Paria on the western side of the island, has a population of probably 70,000. The city is electric lighted and contains an excellent traction system. San Fernando (population about 9,500) is the second city, and there are several towns and cities of from 3,000 to 6,000 inhabitants. A very large proportion of the population is Negro and East Indian.

Trinidad has a comparatively hot climate, but is not unhealthful, although its death rate of 29 per 1,000 is somewhat higher than that of other British West Indian Islands.

The exports of Trinidad for 1913 and 1914 amounted to $16,632,232 and $13,075,039, respectively, and the imports to $14,913,867 and $14,038,266, respectively.

GOVERNMENT BONDS.

The public debt of Trinidad and Tobago, as of 1915, amounted to £1,589,593, as compared with £1,041,193 in 1905. The annual charges for the debt amount to £88,800, as compared with £58,810 in 1905. The total revenue of the colony during 1915 was £934,524 and the expenditures £990,715. The per capita debt in 1916 was £3 18s. 10½d.

The principal loans of Trinidad consist of: (1) £3,600 5 per cent debentures of 1874 and 1878 (original issue, £250,000); (2) £8,400 4 per cent debentures of 1880 and 1881 (original issue, £250,000); £972,593 4 per cent inscribed stock (original issue, £972,593); £600,000 3 per cent inscribed stock. (See "British West Indian bonds as investments," p. 480.)

The £250,000 5 per cent debentures were originally issued at and above par—£150,000 in 1874 and £100,000 in 1878. A cumulative sinking fund of 1 per cent per annum has, as stated, practically redeemed the issue.

The £250,000 4 per cent bonds were issued, £150,000 in 1880, at an average of 96 per cent, and £100,000 in 1881, at 101¾ per cent. The cumulative sinking fund of 1 per cent per annum has, as shown, redeemed practically the entire loan.

The £972,593 4 per cent inscribed stock was offered: £100,000 in 1892 at 101 or better, the price realized being approximately 102⅜; £550,000 in February, 1914, at 99; £322,593 in exchange for various debentures. The bonds were quoted at 77 in January, 1918. A sinking fund of 1 per cent per annum, cumulative, will retire the issue by March 15, 1942, and the government has the right to retire the issue at 100. Interest is payable March and September 15.

Of the £600,000 3 per cent inscribed stock, £400,000 was offered in July, 1897, at a price of approximately 98 per cent, the balance, £200,000, being sold in March, 1902, at an average price of slightly more than 93½. The January, 1918, price for bonds of the issue was 61. The interest is payable January and July 15, and a sinking fund of 1 per cent per annum, cumulative, will retire the issue on or before July 15, 1944. The entire issue may be redeemed at par at the option of the government on and after July 15, 1922.

These securities are transferable free of stamp duties, and all payments in respect to interest, etc., are made by the Crown Agents for the Colonies, 4 Millbank, Westminster, S. W., London, England.

RAILWAYS.

Railway enterprise in Trinidad had its beginning in the seventies, a 16-mile line from Port of Spain, the capital, to Arima having been completed in 1876. During the early eighties a branch was completed from St. Joseph, 7 miles from Port of Spain, to San Fernando, second city in the island, 35 miles from the capital, as well as a short line from near San Fernando to Princes Town. The Arima line was later extended to Sangre Grande, on the windward side of the island, and other branches were constructed, until a length of about 100 miles has been reached. The development of the system is illustrated in the following table:

Years.	Mileage.	Number of passengers carried.	Gross earnings.	Net earnings.	Capital invested.
1877	16	321,317	£18,097	£6,540	£175,472
1882	43½	699,767	43,337	11,079	533,363
1887	54¼	764,560	53,949	15,734	602,638
1892	54¼	679,453	51,841	15,198	602,638
1897	60¾	816,317	67,116	20,860	681,559
1902	81⅛	1,030,965	82,250	28,115	881,570
1907	81½	1,266,501	89,695	29,234	910,390
1912	81½	1,387,747	107,804	41,786	932,002
1913	88	1,313,156	100,116	31,283	932,758
1914	94⅜	1,411,076	115,008	41,319	934,758

The gross receipts for the year 1914 were at the rate of £1,218 per mile and net earnings at the rate of £438 per mile.

In the year 1915 the gross receipts totaled £132,668, and operating expenses and capital expenses were £104,111. First-class passenger fares vary from 7½ to 9 cents a mile, according to distance; second-class rates are from 4½ to 6 cents; and third class, from 2½ to 3 cents. The railway operates a number of its trains in conjunction with local steamers that give service to a number of the coastal towns and to the oil fields and the pitch lake located at La Brea. Through rail and steamer tickets are sold. Twelve passenger trains run daily in each direction to and from Port of Spain, with additional trains on certain days. About 60 per cent of the railway's income is derived from passenger fares.

PUBLIC UTILITIES.

The most important public utility in Trinidad is operated by the Trinidad Electric Co. (Ltd.), a Canadian enterprise, incorporated in 1899. This company in 1901 acquired the Trinidad Electric Light & Power Co., the Belmont Tramway Co. (Ltd.), and the Tramway Co. of Trinidad (Ltd.). The company, which is tax exempt under its charter, has an exclusive franchise for 30 years from 1902 in the city of Port of Spain and within a radius of 5 miles thereof. At the end of the 30-year period the government may purchase the properties at a value to be decided on by arbitration; otherwise the franchise is ipso facto extended for 20 years, and so for successive 20-year periods.

The capitalization of this company consists of $1,164,000 shares of a total authorized issue of $1,200,000 (par of shares $4.80). There are also outstanding $720,000 first-mortgage 30-year gold 5 per cent bonds due 1931, and $29,000 7 per cent debenture notes. The property was carried as of December 31, 1916, at a valuation of $2,072,678, and there was a credit balance to profit and loss of $268,376. Dividends of 5 per cent per annum were maintained on the stock for a number of years up to July, 1915; no later dividends had been paid to May, 1917. The total number of passengers carried during 1916 was 3,070,733; the tramway mileage operated, 12½; passenger cars in use, 24; car mileage, 649,461; incandescent lamps, 26,433; arc lamps, 121; horsepower stationary motors, 171⅓. Total earnings for 1916 amounted to $242,657, as compared with $228,140 in 1915, $225,873 in 1914, $225,215 in 1913, and $224,548 in 1912. The earnings for 1916 were derived $126,199 from the traction lines, $106,788 from electric lighting and power, and the remainder mostly from the ice plant. Total operating expenses for 1916 were $137,128 ($137,675 in 1915), and net earnings were $105,529 ($90,565 in 1915 and $99,561 in 1914). The interest on bonds, $36,000, represented the total charges, a balance for dividends remaining to the amount of $69,529, as compared with $54,465 in 1915, $63,591 in 1914, and $62,346 in 1913. The head office of the company is in the Keith Building, Halifax, Nova Scotia.

The telephone service in the colony is maintained by the Trinidad Consolidated Telephones (Ltd.), incorporated in 1909 in Trinidad to acquire the property of the Commercial Telephone Co. The number of subscribers to the service, as of June 30, 1916, was 1,220 and the number of exchanges 8. The company maintains offices at Halifax, Canada, and at Port of Spain, Trinidad, most of its directorate residing in Nova Scotia. Its authorized capitalization is $300,000, of which $210,000 is outstanding. An initial dividend of 3 per cent was paid in September, 1915, this rate having since been maintained each year. The funded debt consists of $210,000 first-mortgage 6 per cent bonds, due January 1, 1939, and subject to call at 110 on any interest date. The property is carried on the balance sheet of the company at $439,325. Gross earnings for the year ended June 30, 1916, amounted to $56,723, as compared with $53,281 in 1914–15, $48,277 in 1913–14, $44,244 in 1912–13, $41,345 in 1911–12, and $38,019 in 1911. Operating expenses and other deductions for 1915–16 were $45,327 and the profits $11,396. Dividend requirements at 3 per cent per annum are $6,300.

PETROLEUM.

The petroleum industry in Trinidad has attained great importance during recent years and has proved a notable factor in the prosperity of the island. In 1915 the amount exported was 14,113,855 gallons, as compared with 12,153,784 gallons in 1914, 4,295,737 gallons in 1912, and 7,000,800 gallons in 1911. The existence of this petroleum has long been known in Trinidad, but the product has been developed only during recent years. The first attempt to obtain petroleum was made by a concern known as the Merrimac Co., which began operations in 1857 near the famous "pitch lake." A depth of 280 feet was attained, and the well is still producing, but the discovery of the product in the United States, litigation, and other causes led to the abandonment of the property in 1859.

In 1866 further attempts to obtain petroleum were made by Capt. Walter Derwent at San Fernando and Aripero Estate, Oropuche. The workers were not very familiar with the methods to be followed in drilling the bore to any considerable depth, although the level of 160 feet was reached and a small amount of oil (about 60 gallons per week) secured. This well is also being operated, though in a modest way, at the present time.

In 1901 the next attempt to obtain petroleum was made, and this marked the beginning of the rapid development of the industry. The actual production during the governmental fiscal year 1915 was 36,753,931 imperial gallons. Sixty-five wells were sunk during the year, the total depth of drilling for the same period being 57,969 feet. The quality ranges from light oils, with paraffin base, to heavy asphaltic, some oils giving as high as 51 per cent spirit.

Refineries have been erected and are at work producing gasoline, lubricating and fuel oils, and kerosene, while there are immense storage tanks, docks and shipping facilities, steamers plying to world markets, pipe lines, etc. A number of wells producing upward of 30,000 barrels per day have been sunk, while in October, 1915, one well produced at the rate of 72,000 barrels per day.

The Trinidad Lake Petroleum Co., one of the important producers, sank a well in May, 1913, which at the depth of 1,900 feet began to give oil at the rate of 50,000 barrels a day, though the production subsequently declined to 20,000 barrels per day. The well was not long in operation when it caught fire, causing a considerable loss to the company. After the fire had been extinguished the well produced again, but only at the rate of 3,000 barrels per day.

A description of various oil producers and prospects in Trinidad will be found in the Appendix.

MANJACK AND ASPHALT.

Practically the only mining carried on in the colony, other than the operations of the pitch lake, is for manjack, used in making varnish, for insulation, and as an asphalt. Between 1,500 and 2,000 tons of this mineral are mined annually, the value of the production not exceeding $35,000.

The famous pitch lake of La Brea is a valuable asset to the colony as a revenue producer. The lake is leased to a subsidiary of the General Asphalt Co., of the United States, the concession expiring in 1930. Although it is generally believed that the supply of pitch is inexhaustible, it is stated that its probable depth is 138 to 150 feet and its lease of life at the present rate of production is estimated at more than a century. The fall of the lake has approximated 4 feet

9 inches per 1,032,000 tons produced. The company's plant is equipped so that 80 tons of the asphalt may be shipped each hour. The royalty paid to the government is £14,000 per annum and a certain amount additional for each ton shipped. The revenue received by the government from asphalt shipments amounted in 1915 to $166,330, as compared with $180,510 in 1914. Shipments of the asphalt during recent years have been as follows: 1910, 136,595 tons; 1911, 169,127 tons; 1912, 176,077 tons; 1913, 206,414 tons; 1914, 126,453 tons; 1915, 113,645 tons.

Pitch has been found and is mined to a small extent elsewhere in Trinidad. Coal has been found but has not been developed in paying quantities.

AGRICULTURE.

It is estimated that more than 450,000 acres of land are under cultivation in Trinidad, of which about 50,000 acres are used for the raising of sugar, 325,000 for the production of cacao, 25,000 for coconuts, 13,000 for rice, 5,000 for coffee, and the rest of the acreage for miscellaneous products, such as bananas, etc. The past two or three years have witnessed good crops and excellent prices, which have had much to do with the increased prosperity of the island. In addition to the land under cultivation, there are further available 600,000 acres for agricultural development.

Sugar growing has undergone a revival since the outbreak of the war, the production for the year 1916 exceeding all records. The year's production was 64,231 tons of sugar, of which 20,890 was ground at the Usine Ste. Madeleine, 5,340 tons at the Caroni Estate, 7,559 tons at the Tennants' Mission and Southern Estates, 6,505 tons at Waterloo Estate, and the remainder at various other estates. A total of 19,226 persons are employed in the industry, including 5,766 at the Usine Ste. Madeleine, which is the central factory of the Ste. Madeleine Sugar Co. (Ltd.). This plant is located at San Fernando and is a thoroughly up-to-date one. Approximately 17 plantations are owned by the company. During recent years the sugar crops of Trinidad have been as follows: 1907, 50,564 tons; 1908, 48,933 tons; 1909, 52,972 tons; 1910, 51,950 tons; 1911, 46,718 tons; 1912, 40,936 tons; 1913, 42,331 tons; 1914, 55,488 tons; 1915, 58,822 tons; and 1916, 64,231 tons. Approximately 90 per cent of the sugar is exported, mostly to Great Britain and the United States. The government's tax on the production of sugar amounts to 4s. 4d. for every ton of 2,000 pounds; 4s. of this sum is used toward the general revenue of the colony and the balance, 4d., in aid of agriculture. There is a production tax on rum of 1d. per gallon; 91,589 gallons of this rum were exported during 1915, as compared with between 100,000 and 300,000 gallons during the 10 preceding years. The molasses production for 1915 amounted to 495,563 gallons, compared with 423,942 gallons in 1914, 339,496 gallons in 1913, and 450,068 gallons in 1912.

Although Trinidad is not a world leader in field cultivation of sugar cane, it may readily be said that its sugar factories are among the very best in the West Indies. Labor, mostly East Indian, is cheap and fairly abundant. There are approximately 53 sugar estates in the island at the present time, and although these suffered in common with other sugar estates in the British West Indies during the long period of low prices prior to the war, they are to-day yielding substantial returns to their owners.

Cacao raising is the staple agricultural industry of the island and represents a very large investment. There are nearly 1,000 estates wholly or partly devoted to the production of cacoa. This industry is stated to offer the best returns to investors in Trinidad, whether it be in the formation of new estates, the purchase of established and developed properties, or the investment in shares, interests, or obligations. Investors in cacao estates usually receive from 6 to 10 per cent and even higher on their capital outlay. This is an excellent field, but anyone entering it should be careful to have the estate valued by some thoroughly competent appraiser.

Most of the large developed cacao properties in Trinidad consist of a number of small adjoining properties that have been acquired from time to time and consolidated. It is only on rare occasions that a fully developed, well-located property comes into the market. An estate of 99 acres, which may be called the standard in Trinidad, planted at 13 feet by 13 feet and with allowances for all buildings, should contain, roughly, 22,000 trees. The cost of a plantation of such dimensions, including interest at 8 per cent during the period of nonproduction, should not greatly exceed $15,000 and would be worth at full market value, when in bearing, practically double that figure. It usually takes 10 years before full returns may be earned on cacao investments. Profits are realized, however, at a much earlier date. Crown lands available for the production of cacao and other agricultural products may be obtained at £2 10s. per acre, including the cost of survey. The maximum acreage at this price is 99. When the area of the parcel exceeds 100 acres, the price must not be less than £5 per acre unless the Secretary of State for the Colonies authorizes a lower rate.

The exports of cacao during the past 10 years have been as follows: 1906, 246,169 hundredweight; 1907, 444,023 hundredweight; 1908, 438,724 hundredweight; 1909, 460,492 hundredweight; 1910, 516,595 hundredweight; 1911, 444,561 hundredweight; 1912, 370,765 hundredweight; 1913, 429,611 hundredweight; 1914, 516,490 hundredweight; 1915, 482,870 hundredweight. The value of the cacao exported during 1915 was $9,065,193, an increase (owing to higher prices) of $1,921,513. During 1916 and 1917 better results and prices were realized.

The raising of coconuts is another important industry, 114 estates being engaged wholly or largely in their production. The record crop exported during recent years was 20,602,923 during 1911. Since that year crops have averaged about 15,000,000 nuts. The 1915 crop was valued at approximately $470,000. There is a small business in coconut oil and copra.

Other important, though relatively minor, products are rubber, bananas, and coffee. The prospects in rubber planting are said to be excellent. Small amounts of Trinidad coffee have been exported. There is a small trade in limes and lime juice. Taken as a whole, it may be said that Trinidad offers, agriculturally, greater inducements to the intending settler or investor than the majority of tropical countries. In proportion to its area it is the richest of the British West Indies in natural resources. An estimate of the total value of the agricultural products of the island during 1916 would be $20,000,000 to $25,000,000.

TOBAGO.

The island of Tobago lies to the northeast of Trinidad, in latitude 11° 9′ N. and longitude 60° 12′ W. The central range attains an altitude of about 1,800 feet, and in this range rise numerous small streams and watercourses. There are about 100 plantations and estates of importance in the island, the products being cacao, coconuts, rubber, and a small amount of sugar and cotton. A century or more ago Tobago was a great cotton producer, but the industry steadily declined in importance. The soil is said to be highly suitable for its cultivation and considerable quantities might be raised. Sugar, for a time the chief product of the island, long ago reached its high-water mark. The present high price of sugar has led to a slight increase in the acreage of the crop and may lead to a general revival of sugar planting. Increasing attention has been given of late to the raising of live stock, and a few cattle are being exported. Nutmegs are also being grown, Tobago being particularly suited for their growth.

Tobago is now a dependency of its neighbor Trinidad and no longer has a separate government. The population does not exceed 25,000. Scarborough, with about 800 inhabitants, located on Rockley Bay, is the capital and principal town. About two-thirds of the island remains uncultivated, and there are extensive forest areas containing fine specimens of hardwood timbers. There is no known mineral wealth.

As is the case in most of the smaller islands of the West Indies, Tobago has no manufacturing industries, and opportunities are almost wholly confined to those existing in the agricultural industry. The laws are liberal and there are considerable areas of Crown lands available for settlement. The field, however, offers little inducement for the extensive investment of capital, though estates requiring moderate investment would doubtless yield good returns.

The island has directly no bonded debt, but shares in the responsibilities of the colony of Trinidad. There are no railways and practically no public utilities. Transportation facilities are furnished by coastal steamers that ply between places of importance on this island and Trinidad. Good roads to the interior do not exist.

THE WINDWARD ISLANDS.

ST. LUCIA.

St. Lucia, one of the Windward Island group, lies to the northwest of Barbados. Its area is 233 square miles and its population approximately 50,000. Castries, the chief town, has a population of 6,000 and is located on a beautiful landlocked harbor having sufficient depth of water to accommodate very large vessels. Steamers may dock here, and for this reason the port has become important as a coaling station. The town itself is not imposing. It has few improvements other than a good water system and its population is nearly all black.

PUBLIC DEBT.

The bonded debt of St. Lucia is not large. The principal issues consist of approximately £85,479 four per cent inscribed stock, due 1919–1944 (interest February and August), and £46,900 four and one-half per cent debentures which are retirable through a sinking fund. Interest is payable on this latter issue May and November, and it is listed on the London Stock Exchange. A further description of this issue is given under the general heading "British West Indian bonds as investments" (p. 480). There is a small debt in addition to the 4 per cent inscribed stock and 4½ per cent debenture loan, largely incurred to meet war expenses. Castries has outstanding approximately £2,510 in loans. Public revenues during 1916 amounted to approximately £65,000, a figure slightly in excess of expenditures.

RAILWAYS AND PUBLIC UTILITIES.

There are no railways on the island of St. Lucia, nor is there room for any under present conditions. Public-utility development is limited to 180 to 200 miles of telephone, a good water system, and a very substantial public market at Castries. That town is lighted by paraffin, and there is hardly an opportunity at present for electric lighting. The field is a very small one.

INDUSTRIES.

There are no manufacturing industries on the island other than a government lime-juice factory and a few sugar mills. There is little opportunity for development along these lines.

The coaling of ships forms to-day the principal industry of Castries and furnishes a livelihood to a large portion of the population. During the normal year 1913, 535 steamers were coaled at the port, taking on 117,531 tons of coal.

Approximately two-thirds of the available agricultural areas of St. Lucia are to-day under cultivation. Sugar and cacao share honors. Of the former, 4,628 tons were exported in 1915, as well as 17,000 gallons of molasses and 26,054 gallons of rum, these being valued at £89,466, as compared with £46,279 in 1914, £67,679 in 1913,

£56,000 in 1912, and £56,004 in 1911. The 1916 and 1917 crops were likewise very satisfactory and produced increased revenues to the owners of the estates. St. Lucia is very good sugar territory, and the revival in the industry is pronounced.

Cacao is second in importance among the agricultural products and has in recent years been planted in increased quantities. In 1915 a total of 18,478 hundredweight of cacao was produced, yielding £51,495. This was a slight increase over the crop for the year 1914.

Limes are being raised in increasing quantities, the 1915 crop totaling 21,363 barrels as compared with 12,765 barrels in 1914. The value of the 1915 crop was £7,312. It is claimed that 50,000 barrels and upward should easily be produced, as the soil and climate of the island are highly suitable for the growth of limes.

Coconuts head the minor crops, and the production is showing a steady annual increase. In 1911 the exports amounted to 20,280 nuts, in 1912 to 43,164 nuts, in 1913 to 80,097 nuts; in 1914, owing to the war, the exports fell off to 53,638 and in 1915 increased to 67,206. In addition, copra is shipped in small quantities. The high price of ship tonnage affects the industry. Attention is also being directed to the bay trees, and it is claimed that a most excellent variety of bay rum may be produced. It is expected that this will prove a source of revenue to the island. Other minor crops are raised in moderate amounts. The island, though mountainous, is rich agriculturally.

GRENADA.

The island of Grenada lies midway between Trinidad and St. Vincent at about latitude 12° N. Its area is 133 square miles and the population about 68,000. The annual foreign trade amounts to about $3,000,000. St. George, the capital, has a population of about 5,500 and is beautifully located on a harbor of similar name. Although mountainous (the highest elevation is 2,750 feet), the island is intensely cultivated and extremely fertile. There are several rivers, a lake, and numerous springs.

FUNDED DEBT.

The debt of Grenada is discussed in the section "British West Indian bonds as investments" (see p. 480). The principal and only important issue of the colony consists of £123,670 4 per cent inscribed stock, retireable by sinking fund between the years 1917 and 1942. These bonds sold at a high premium before the outbreak of the war, closing July 27, 1914, at 99. In January, 1918, they were quoted at 77 per cent.

PUBLIC UTILITIES.

Tenders have been asked from time to time from the government for the installation of a lighting system in St. George and its suburbs. There is good water in the island. No railways exist, a coastal steamer operated by the Royal Mail Steam Packet Co. furnishing the necessary means of transportation to the various towns of the island, most of which are located along the coast.

INDUSTRIES.

Grenada is preeminently a producer of cacao, nutmegs, and other spices, ranking next to Trinidad among the British West Indies as a producer of cacao. It is said that in proportion to area the island is the greatest cacao producer in the world. Exports of cacao in 1916 amounted to 77,029 bags, as compared with 62,166 bags in 1915. The amount of spices (nutmegs and mace) exported during the fiscal year 1915 was 1,674,286 pounds, as compared with 1,372,940 pounds in 1914 and 909,280 pounds in 1911. The value of the 1915 crop exported was £37,284. Cotton to the value of £10,740 was also exported.

ST. VINCENT.

St. Vincent has no public debt outstanding. There are no railways in the island, nor are there any industries in which the investing public might be interested. The island is fertile and splendidly suited for cotton raising, as well as for the production of arrowroot. Cacao is raised. Increasing attention has been given of late to the growing of coconuts, and companies with fair amounts of capital would probably make money in this field.

The island sadly lacks fertilizers, and there would perhaps be room for a plant equipped for the manufacture of cottonseed fertilizers.

St. Vincent has a population of approximately 45,000.

BRITISH WEST INDIAN BONDS AS INVESTMENTS.

In British West Indian colonial bonds and inscribed stock is to be found a class of "near at home" securities worthy of attention. The West Indian possessions of Great Britain, many of them long dormant, are feeling the benefits of the present boom in sugar. Plantations have been cleared and put in order, and more progress is to be noted than has existed at any time during the past quarter century. British Guiana, Great Britain's only South American possession, has likewise felt the effects of the rise in sugar.

The securities of the British colonies are free from all stamp taxes, and in normal times sell at very high figures. At present prices, in view of their short maturities, their yield in several instances is well above 5 per cent, and in the event of their being called for payment by sinking fund the yield and profit will be much larger. The present low prices should be noted:

Securities.	When redeemable.	Price on July 27, 1914.	1917 price.	Decline.
Antigua 4 per cent	1919–1944	100	76	24
Barbados 3½ per cent	1925–1942	88	68	20
British Guiana 4 per cent	1935	99	82	17
British Guiana 3 per cent	1923–1945	78	61	17
Grenada 4 per cent	1917–1942	99	77	22
Jamaica 4 per cent	1934	100	77	23
Jamaica 3½ per cent	1919–1949	88	67	26
Jamaica 3 per cent	1922–1944	79	62	17
St. Lucia 4 per cent	1919–1944	98	77	21
Trinidad 4 per cent	1917–1942	101	77	24
Trinidad 3 per cent	1922–1944	78	61	17

The 4 per cent bonds of the island of Antigua were first offered for public subscription in the year 1894, the price being 103½. The issue is for £100,000 ($486,650), which is practically the entire public debt of the island. A sinking fund will purchase bonds up to par from 1919 to 1944.

The 4 per cent and 3 per cent loans of the colony of British Guiana are outstanding to the amounts of £194,500 and £250,000 ($946,535 and $1,216,625), respectively. These issues and other securities to an aggregate amount of about £100,000 represent the total debt of the colony. The 4 per cent loan was originally issued at about 98, while the 3 per cent issue was brought out part at 96¾ and part at 93. Both issues are provided with sinking funds.

The Barbados 3½ per cent loan is for £375,000 ($1,824,940). The original offering price of this issue was 102⅜ per cent, which reflects the excellent credit of this island.

Grenada's 4 per cent loan is outstanding to the amount of £123,000 ($598,580), this representing practically the entire debt of the colony.

The issue was originally brought out at about 101 and at one time sold as high as 111½. Conditions on this island are said to be much better than for some time past, and it should be able to take care of its obligations without assistance from the mother country. Sinking fund began operation in 1917 and will redeem bonds prior to 1943. Grenada has a population of about 68,000.

The Jamaica loans are outstanding as follows: 4 per cent, £1,099,048 ($5,348,515); 3½ per cent, £1,493,600 ($7,268,605); 3 per cent, £200,000 ($973,300). The 4 per cent loan was originally subscribed for at prices averaging from 103 to 103½, and is being purchased from time to time for a sinking fund, which will keep the issue alive until its final retirement in 1934. The 3½ per cent loan was issued in 1900 to acquire the Jamaica Railway, the bonds being taken by the company's first-mortgage bondholders.

St. Lucia is enjoying prosperity now that a British West Indian coaling station has been established there. The colony's population slightly exceeds 50,000. The 4 per cent bond issue is for £85,479 ($415,985). It was brought out at 102 and higher. St. Lucia has also a small 4½ per cent debenture issue (£49,100, or $238,945) outstanding; these debentures may be purchased at about 90–91. They are being redeemed by a sinking fund, which buys the debentures up to par.

Trinidad, with its oil boom and increased production of sugar, is in excellent financial condition. The island, with its dependency, Tobago, has a population of approximately 360,000. Large revenues are received through royalties on asphalt, sale of Crown lands (largely to oil companies), etc. Its 4 per cent sinking fund loan (£972,500, or $4,732,670) sold originally at 99 to 103½. The 3 per cent sinking fund loan (£600,000, or $2,919,900) was brought out at 98. The loans have been issued for the construction of railways, roads, harbor works, and other public works.

British Honduras, England's Central American possession, has outstanding three principal loans, as follows: (1) £29,000 4½ per cent debentures of 1918–23 (sinking fund 2 per cent per annum); (2) £43,100 4 per cent 10-year debentures due 1921, issued privately in 1911 (original issue £160,000; balance converted into 4 per cent inscribed stock); (3) £116,900 4 per cent inscribed stock due 1941–71.

The Bahamas group has outstanding two small external loans, one bearing interest at 4½ per cent (£35,000 issued; £14,500 outstanding) and one at 4 per cent (£15,000 issued and outstanding). Naturally no wide market exists for these small issues.

APPENDIXES.

Appendix A.—SOUTH AMERICA.

The information contained in this and the following appendixes is designed to supplement the facts and illustrate the conclusions presented in the text of the report proper. Data are here given with regard to numerous enterprises, most of which are not discussed (to any considerable extent, at least) in the preceding pages. There are brief accounts of the companies' activities, followed, in general, by statistics of capitalization, dividends, and income, and the names of the principal officials. Quotations of securities are given in some places. It is hoped that persons interested in investments and the development of Latin-American opportunities may obtain from these statements an idea of the results that have followed the utilization of capital in certain fairly typical instances.

ARGENTINA.

ALTO PARANA DEVELOPMENT CO. (LTD.).

Registered 1912. Acquired the 600,000 pesos shares (Argentine gold) of the Sociedad Anónima Compañía de Maderas del Alto Parana. Approximately 621,000 acres of hardwood forests and 57,500 acres of pine forests in the State of Parana, Brazil, are owned, as well as a sawmill at Corrientes, Argentina. The cutting of timber is not being actively carried on at present, owing to abnormal war conditions; the only business that is being actively prosecuted is in connection with wild and cultivated yerba mate (Paraguayan tea).

Capitalization.—£330,000 6 per cent and participation noncumulative preference shares and £330,000 ordinary shares (par £1); no dividends; £300,000 of the ordinary shares were issued to acquire the shares of the Argentine company.

Income account.—Year 1914–15: Alto Parana Development Co. Interest received (net), £851; London expenses since incorporation, £1,628. Argentine company—From interest, discount, commissions, and natural yerba sales, £1,758; expenses, £10,637; debit balance to profit and loss, £33,383; losses in previous accounts in suspense, £19,167.

Directors.—James Railton, chairman; Henry J. Bell, Hon. Eric B. Butler-Henderson, A. G. Gumpert, Stephen H. M. Killik; secretary, George R. Cable, River Plate House, London, E. C. Argentine company: H. H. Leng, president; C. Lockwood, director.

Preference shares quoted in London.

ANGLO-ARGENTINE TRAMWAYS CO. (LTD.).

Registered 1877. Reconstructed and reregistered 1887.

This company operates the largest and most important tramway system in Buenos Aires and, incidentally, in South America. Prior to 1900 the lines were operated by horse system; in 1903 the work of electrification was completed. Subsequently the Buenos Aires Tramways Co. (Ltd.), Buenos Aires & Belgrano Electric Tramways Co. (Ltd.), Buenos Aires Grand National Tramways Co. (Ltd.), etc., were acquired. In 1910 this company obtained from the municipality of Buenos Aires a concession for the construction of about 20 miles of subway. The first section of this subway (6 miles) was opened in December, 1913, and additional mileage completed in 1914. Owing to the outbreak of the war the completion of additional subway mileage has been delayed. The municipality receives 6 per cent of the gross receipts of the subway as per terms of the concession, which expires March 18, 1990. On this date the entire property reverts to the municipality without compensation.

Earnings.—The growth and expansion of this system is indicated by the following table:

Years.	Receipts.	Expenditures.	Passengers carried.
1902	£254,582	£191,136	27,419,183
1905	720,488	464,872	82,442,410
1908	1,262,759	790,687	142,939,805
1911	2,631,836	1,723,928	299,154,835
1912	2,778,302	1,824,021	316,260,097
1913	2,963,191	1,969,161	342,140,422
1914	2,850,995	1,880,996	322,015,254
1915	2,709,615	1,786,740	316,982,449

On December 31, 1915, 2,731 cars were owned, and approximately 365 miles of main line and 619 miles of track were operated in 1915.

Income account.—The income account for the year ended December 31, 1915, resulted as follows: Gross receipts, £2,709,616; operating expenses and taxes, £1,786,740; net receipts, £922,876; total net income, £986,513; interest, rental, and sinking fund, £586,642; first preference dividend, 5½ per cent, £176,000; second preference dividend, 5½ per cent, £137,500; balance carried to balance sheet, £2,289.

Capitalization.—(*a*) Debenture stocks, £12,007,141 outstanding:

4 per cent debenture stock, £4,465,674 authorized, £4,296,376 outstanding, largely issued in exchange for debentures of absorbed corporations; redeemable by sinking fund at not more than 102, entire issue to be redeemed by 1968; subject to call at 102 on six months' notice; £169,298 redeemed prior to December 31, 1915; interest payable June 30 and December 31.

4½ per cent debenture stock, £1,733,380 authorized, £1,710,765 outstanding, balance redeemed; due January 1, 1985; ranks subject to 4 per cent debenture stock.

5 per cent debenture stock, £6,000,000 authorized and outstanding; sinking fund commences 1916, drawings at par; subject to above issues.

(*b*) Stocks, £8,950,000 outstanding:

5½ per cent cumulative first preference, £4,000,000 authorized, £3,200,000 outstanding; par £5; dividends June and December.

5½ per cent cumulative second preference shares, £3,000,000 authorized, £2,400,000 outstanding; par £5; dividends June and December.

Ordinary shares, £4,000,000 authorized, £3,250,000 outstanding; par £5.

Above shares, except ordinary shares, are listed on the London Stock Exchange.

Cost of concession and other property, construction, and equipment to December 31, 1915, £19,384,972. Profit and loss credit carried forward, £94,120.

Dividends on ordinary shares.—1907, 8 per cent; 1908, 7¼ per cent; 1909, 6 per cent; 1910 and 1911, 7¾ per cent; 1912, 8¼ per cent; 1913, 6¾ per cent; 1914, 1915, and 1916, none.

Directors.—J. B. Concanon, chairman; L. Cassel, G. Cicogna, H. F. Gunning, W. F. Hamilton, K. C. J. Heaton, D. Heineman, Baron L. Janssen, G. De Laveleye, C. M. Rose, C. H. Sanford, G. A. Touche, M. P. Committee in Buenos Aires: Samuel Hale Pearson, chairman; Hugh Wilson; general manager, G. Pedriali. Office: Greslian House, London, E. C.

ARGENTINE IRON & STEEL CO. (LTD.).

Registered 1912. Acquired the brass, iron, and steel castings business of Pedro Vasena & Sons, of Buenos Aires; purchase price £953,283, £453,283 cash, balance ordinary shares; ordinary-share capital later reduced.

Capitalization.—February 28, 1915 (latest figures obtainable): Preference shares (par £1, entitled to 6 per cent per annum cumulative and 20 per cent of profits), £500,000 authorized, £500,000 outstanding; ordinary shares (par 12s., 99,770 unissued shares par £1), £459,908 authorized, £360,138 outstanding;

6 per cent first-mortgage debentures, £350,000 authorized, £321,300 outstanding (balance redeemable through sinking fund; interest on debentures March and September); total, £1,309,908 authorized, £1,181,438 outstanding.

Income account.—Year ended February 28, 1915: Profit on trading, £102,192 (£63,485 in 1913–14 and £130,363 in 1912–13); surplus, £57,171 (£19,776 in 1913–14 and £67,360 in 1912–13). Of the surplus for 1914–15, £27,171 was transferred to reserve for contingencies. Stock on hand and in transit, £448,178.

The company has reduced its floating debt from £243,159 as of February 28, 1914, to £105.816 as of February 28, 1915. Since the latter date a further reduction has taken place. Dividends of 6 per cent per annum are being paid on the preference shares.

Directors.—Señor Don Pedro Vasena, chairman; Charles Lock, vice chairman; Baron Emile Beaumont d'Erlanger, James C. Dunn, John C. Gibson, Baron Hubert de Pfeffel (Paris). Offices: Buenos Aires, Argentina; 8 Crosby Square, London, E. C.; and Paris, France.

ARGENTINE LAND & INVESTMENT CO. (LTD.).

Incorporated 1870 as the Central Argentine Land Co., to acquire the lands ceded by the Government of Argentina to the Central Argentine Railway. Reregistered 1888 under present title. Properties are owned at Las Veras, Province of Cordoba, and in the Provinces of Santa Fe and Chubut (leased to Argentine Southern Land Co.). Town and camp lands are owned, the camp lands (original concession) unsold June 30, 1915, amounting to 83,898 acres, of which 79,841 acres were located in the Province of Cordoba and 4,057 acres in Santa Fe. Lands are rented, sold, colonized, stocked with cattle, etc. The original concession is carried at a net value of £70,916; other properties at cost, £117,135; land installments unmatured and colonists' balances outstanding, £191,743; cash, £38,372; mortgage loans, £212,575; investments, £19,998.

CAPITALIZATION, JUNE 30, 1915.

Securities.	Authorized.	Outstanding.
Preference shares, 5 per cent cumulative (par £4) [a]	£520,000	£435,840
Income stock, 4 per cent	[b] 133,476	[b] 55,174
Ordinary shares (par £1) [c]	130,000	[c] 52,234
Debenture stock, 4 per cent (interest quarterly, February)	100,000	[d] 9,325

[a] After income stock issued is fully redeemed these shares will be entitled to 5 per cent per annum cumulative (as at present); when the ordinary shares have received 10 per cent both issues will share pro rata for further dividends.

[b] Original issue £133,476 in 1906 to fund 30⅜ per cent arrears in preference dividends; balance retired through sinking fund.

[c] 10s. paid in; balance uncalled.

[d] Original issue £63,780; balance retired through sinking fund.

INCOME ACCOUNTS.

Items.	Year ended June 30—	
	1914	1915
Land sales	£41,592	£25,482
Rents (net)	11,225	33,043
Interest	18,205	20,016
Total (including miscellaneous)	71,449	78,750
Expenses, depreciation, etc	18,969	31,843
Profits	52,480	46,907
Interest	385	373
Surplus	52,095	46,534

Of the surplus for 1914–15, £20,000 was appropriated for reserves. After dividend payments £18,840 was carried forward. Reserves June 30, 1915, £62,208. Dividends on ordinary shares, 1911 to 1916, 5 per cent per annum.

Directors.—Charles Darbyshire, chairman; Gordon H. Brown, F. C. im Thurn, Cecil Mallet, Sir William L. Young; secretary, R. J. Parker, Palmerston House, Old Broad Street, London, E. C. General manager: Donald Fraser, Rosario, Argentina.

ARGENTINE METALS (LTD.).

Registered 1914. Owns wolfram mines, located at Pisco Yacu, Province of San Luis, Argentina. Further information not available.

Capitalization.—£10,000 10 per cent cumulative preference, £15,000 ordinary, and £5,000 deferred shares, par £1.

Secretary: C. Tomkins, 101 Leadenhall Street, London, E. C.

ARGENTINE NORTHERN LAND COMPANY (LTD.).

Registered 1908 to acquire properties of land from a company owning some 1,970 acres situated along the route of the section of the Cordoba Central Railway between Buenos Aires and Cordoba.

Capitalization.—Authorized, £500,000 shares, par £1; outstanding, £329,487,

Report for 1915 states that the net profit for the year amounts to £3,731, of which £1,100 has been placed to reserve to protect doubtful debts, leaving £2,631, as compared with £1,003 for the previous year. The profit for the year reduces the amount standing to debit of profit and loss to £7,630. The value of the land sales effected, after deducting expenses, exceeds the cost of the land sold by £7,837. Of the total area of the company's lands purchased from time to time, 2,139,819 meters have been sold or utilized for public purposes, leaving 9,304,940 meters to be disposed of. In view of this holding the directors do not consider it desirable at present to make further purchases, and consequently, as the capital released by the sale of lands is received, the funds are being employed in London in the purchase of Treasury bills. The company has already invested in this manner £8,000.

Directors.—G. W. Hoghton, chairman; L. Clow, F. Holt; secretary, J. Heath
Office: 3 St. Helen's Place, London. E. C.

ARGENTINE TIMBER & ESTATES CO. (LTD.).

This company was incorporated in 1915 to take over the assets of a company with a similar title, consisting of a property of 193 square miles situated in the Province of Jujuy, Argentine Republic, mostly covered with quebracho forests. Sawmills, a tanning-extract factory, cattle, and ranching properties are also owned. About 300 men were at work on the estate in 1915. Quebracho extract is to be delivered to the Forestal Land & Timber Co. at the rate of approximately 2,500 tons per year.

Capitalization.—£15,350 ordinary shares (par 1s.); deferred shares, £21,342 (par 1s.). The ordinary shares will be entitled to 90 per cent of all profits. Approximately £90,000 6 per cent debentures have been issued, including £75,000 to the holders of debentures of former company. Interest payments began May 1, 1917.

No accounts have been published thus far.

Directors.—G. W. Hoghton, chairman; L. Clow, C. H. Thomas; secretary, E. H. Orchard. Address: 3 St. Helen's Place, London, E. C. Manager: J. B. Leahy.

ARGENTINE TOBACCO CO. (LTD.).

Incorporated 1911. Acquired during 1911 and 1912, 19 tobacco, cigar, and cigarette manufacturing companies.

CAPITALIZATION, OCTOBER 31, 1915.

Securities.	Authorized.	Outstanding.
Preference shares (par £1), entitled to a fixed cumulative dividend of 6 per cent per annum and 25 per cent of the surplus divisible profits	£934,919	£834,919
Ordinary shares (par 10s.), entitled to a dividend of 6 per cent per annum and 50 per cent of the surplus divisible profits	934,919	845,831
Deferred shares (par 1s.), entitled to 25 per cent of the surplus divisible profits	93,492	83,492
7 per cent first debentures, redeemable by 1920, at 105 per cent	[a] 650,000	[a] 456,900
Total	2,613,330	2,221,142

[a] Balance redeemed by sinking funds.

INCOME ACCOUNTS.

Items.	Year ended October 31—		
	1913	1914	1915
Profit on trading	£389,891	£386,668	£374,509
General charges in Argentina	241,239	245,060	167,238
Balance	148,652	141,608	207,271
Total, including other income	149,106	141,713	208,398
Profit after interest and other charges	105,413	103,293	156,594
Depreciation, reserves, reduction of goodwill, etc	4,186	[a] 160,860	156,594
Bond sinking fund	100,000	Deferred.	Deferred.

[a] Includes £57,567 transferred from reserve.

Directors.—In Europe: Baron Emile B. d'Erlanger, chairman; John C. Gibson, deputy chairman; Baron Frederic A. d'Erlanger, Pierre Girod, George Kitchen, and Baron Frederic Portalis, directors. In Buenos Aires: Leon Duran, president; Victor Negri, vice president; Arturo Viader, general manager; Herman Hentsch, H. H. Long, Agustín Leon, M. Mendez de Andes, Oswaldo Testoni; secretary, T. H. Darton. Offices: 8 Crosby Square, London, E. C.

BUENOS AIRES & PACIFIC RAILWAY.

The report of the general manager states that the capital of the system administered by the Buenos Aires & Pacific Railway amounts, according to the books, to $250,607,000 gold.

In the year 1916 the net profits amounted to $9,638,468 gold, being an interest return of 3.85 per cent upon the capital invested. * * * But the small interest yield is not confined to the year 1916. The situation has been the same for several years past. The scale of yields, over a period of six years, has been as follows: In 1911, 4.58 per cent; in 1912, 4.37 per cent; in 1913, 4.25 per cent; in 1914, 3.23 per cent; in 1915, 4.01 per cent; and in 1916, 3.85 per cent.

The figures of the capital, the gross receipts, the working expenses, and the profits from 1910 onward, are shown in the following table:

Years.	Capital.	Gross receipts.	Working expenses.	Profit.
1910	$209,440,812	$23,298,582	$13,344,355	$9,954,227
1911	218,157,860	24,647,746	14,649,922	9,997,824
1912	225,399,438	25,417,396	16,547,384	9,870,012
1913	234,219,544	27,138,807	17,172,178	9,966,629
1914	238,093,900	22,014,620	14,316,756	7,697,864
1915	249,875,120	24,378,684	14,367,571	10,011,113
1916	250,607,331	24,393,584	14,755,116	9,638,468

The preceding table shows that from the year 1910 up to 1916 the figures of net profits have been maintained almost without variation, there having been no appreciable progress from one year to another, while in 1916 the amount of such profits is seen to have been less by $316,000 gold than that obtained in 1910, notwithstanding that from that year to the present time the capital of the company has increased by $40,000,000 gold and the length of line worked by 800 kilometers (about 500 miles).

In the economic year 1914–15 the cost of the fuel used by the company was $2,225,500 gold. In 1915–16 the figure rose to $2,653,367 gold, and during the year ended June 30, 1917, it had increased to $3,276,307 gold. The cost of fuel per ton, after making the reductions necessary to arrive at its equivalence to coal, was $9.67 gold in 1914–15, $10.80 gold in 1915–16, and $12.29 gold in 1916–17. The cost of fuel per train kilometer, which in the first of the years above mentioned was $0.2035 gold, rose to $0.2776 in 1916–17.

BUENOS AIRES SOUTHERN DOCK CO.

Registered 1898, to construct docks on the banks of the Riachuelo, Buenos Aires. The first section was completed in 1908 and the second in 1914. Valuable lands are owned. The concession is perpetual.

CAPITALIZATION.

Securities.	Authorized.	Outstanding.
Shares (par £10)	£1,000,000	£700,000
4 per cent debenture stock	1,600,000	[a] 1,600,000
Total	2,600,000	2,300,000

[a] Issued to Buenos Aires Great Southern Railway for advances made by the latter.

INCOME ACCOUNTS.

Years.	Gross receipts.	Net working receipts.	Tons handled.
1905-6	£32,105	£11,173	474,792
1910-11	87,712	48,587	852,739
1911-12	98,241	52,363	876,875
1912-13	117,819	55,355	1,122,955
1913-14	114,556	61,212	1,000,906
1914-15	79,429	39,046	810,707

NOTE.—1914-15 net revenue, £39,046; net income, £39,939; interest, £64,000; loss, £24,061. No dividends paid.

CACHEUTA OIL SYNDICATE (LTD.).

Registered 1912. Acquired options to purchase upward of 70,000 acres of petroleum-bearing lands located at Cacheuta, Province of Mendoza, Argentine Republic.

Capitalization.—£36,600 shares (par £1); total authorized, £50.000. Debentures to the amount of £1,500 are also outstanding.

Income accounts are not made public.

Directors.—W. E. H. Firman, G. C. Duffies; secretary, B. M. Allan; 34 Bishopsgate, London, E. C.

CAPILLITAS CONSOLIDATED MINES (LTD.).

Registered 1909 as a reconstruction of the Capillitas Copper Co. (Ltd.). Owns the Capillitas and Atajo groups of mines, together with smelters. The mines (area about 125,000 acres) are located in the Province of Catamarca, Argentine Republic. The ore in sight is estimated at 100,000 tons. Work has been temporarily suspended.

Capitalization.—£600.000 shares authorized (par £1); £410,660 outstanding.

Secretary: G. Hillsdon, 110 Cannon Street, London, E. C.

CATALINAS WAREHOUSES & MOLE CO (LTD.).

Registered 1897. Has issued its own securities against the debentures and shares of the Catalinas Warehouses & Mole Co., of Buenos Aires. A total of 375,322 out of 383,994 ordinary shares of the Buenos Aires company have been exchanged for the British company's securities. More than 40 warehouses are owned.

CAPITALIZATION, DEC. 31, 1915.

Securities.	Authorized.	Issued.	Outstanding.
Ordinary shares (par £2)	£770,000	£750,644	£750,644
4 per cent preference shares (par £5)	650,000	636,350	636,350
4 per cent mortgage debenture bonds (par £50)	700,000	489,500	a 151,900
Total	2,120,000	1,876,494	1,538,894

a Balance redeemed.

NOTE.—The ordinary and preference stocks share pro rata as to dividends after 4 per cent per annum has been paid on each class.

DIVIDENDS.

	1906 to 1909	1910	1911 and 1912	1913	1914 and 1915
	Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	
Preference	4	4	4	4	....
Ordinary	....	2	4	a 2	....

a Free from income tax.

INCOME ACCOUNTS (CALENDAR YEARS).

Items.	1912	1913	1914	1915
Gross receipts	£226,309	£196,467	£104,643	£59,608
Working expenses	£143,727	£129,541	£79,115	£54,656
Net receipts	£82,582	£66,926	£25,528	£4,952
Tonnage handled	541,588	486,955	211,847	152,760

To the net receipts for 1915 there was added: Interest, etc., £1,264; balance from 1914, £16,177; total, £22,394. Charges amounted to £9,140, leaving a surplus of £13,254. Cash on hand December 31, 1915, £34,926; stores, £6,891; other current assets, including £15,566 debtors for surplus lands sold (due 1916–1922), £49,608; sundry creditors, £14,261; other current liabilities, £3,593; balance to net revenue account (surplus), £13,255.

Directors.—Frank Henderson, chairman; Charles W. Parish, R. B. Polhill-Drabble, T. Penn Gaskell, F. G. Fighiera (all of Great Britain); H. H. Leng, Charles Lockwood, Dr. Juan Mendieta (Buenos Aires). General manager, D. Dallas, Buenos Aires. Secretary, G. Brown, Finsbury Pavement House, London, E. C.

CITY OF BUENOS AIRES MARKET CO. (LTD.).

Incorporated 1900 to acquire a property of about 12,300 square meters, used as a market for sale of meat, poultry, game, fish, vegetables, fruit, etc.

Capitalization.—Two million pesos (Argentine paper) shares; also £60,000 (approximately) 6 per cent debentures (of an original issue of £120,000, dated 1900). The debentures were offered for sale at 98½ per cent in 1905 by the Anglo-South American Bank, and are redeemable at par prior to July 1, 1924, by semiannual drawings (June and December).

Dividends.—Years ended August 5: 1907–8, 12 per cent; 1908–9, 14 per cent; 1909–10 and 1910–11, 17 per cent; 1911–12, 18 per cent; 1912–13 to 1914–15, 21 per cent.

Office: 2374 Calle Alsina, Buenos Aires.

CITY OF BUENOS AIRES TRAMWAYS CO. (LTD.).

Registered 1869 to construct a horse tramway system in the city of Buenos Aires. The system was later changed to electric traction. In 1904–5 the property was leased (from Jan. 1, 1905) to the Anglo-Argentine Tramways Co.

(Ltd.), until January 1, 1985. The rental amounts to £70,660 per annum, this payment being guaranteed. This annuity is equal to full interest on the debenture stock and 5 per cent dividend on the shares (see following).

Capitalization.—£1,240,000 shares (par £5); £174,000 4 per cent debenture stock due 1985, interest January and July. The debenture stock is secured by a first charge on the whole of the assets.

Directors.—J. Heaton, chairman; F. C. Crawley, secretary; E. H. Woods. Office: 1 Great Winchester Street, London, E. C.

CONSOLIDATED WATER WORKS CO. OF ROSARIO (LTD.).

This company was incorporated in 1896 to take over the properties of the Rosario Waterworks Co. (Ltd.). The concession to the company expires in 1958, at which time the properties revert to the municipality. The municipality may purchase the undertaking at an earlier date under certain conditions. The company has the exclusive privilege to supply Rosario with water. The total number of services as of December 31, 1915, was 23,790, as compared with 12,609 services as of December 31, 1905.

CAPITALIZATION DEC. 31, 1915.

Securities.	Authorized and outstanding.
Preference shares, 6 per cent noncumulative (par £10)	£140,000
Ordinary shares (par £10)	300,000
4 per cent debenture stock due 1930 (interest January and July)	a 184,583
5 per cent second debenture stock due 1940 (interest January and July)	100,000
Total	724,583

a Original issue £200,000; balance redeemed through sinking fund.

INCOME ACCOUNTS.

Items.	1914	1915
Gross receipts	£125,475	£124,403
Working expenses	50,339	50,628
Net receipts	75,136	73,785

After carrying forward from the previous year the sum of £13,728 and adding interest, and after providing for the fixed charges, such as interest, income tax, reserve fund (£12,000), depreciation, etc., for the year ended December 31, 1915, there remained the sum of £47,378. Of this amount, £8,400 was paid as a dividend on the preference shares (6 per cent) and £24,000 was paid on the ordinary shares (8 per cent). After providing £2,000 for the staff provident fund, £12,979 was carried forward to 1916. The 8 per cent dividend rate on the ordinary stock has been maintained for some years. Current assets as of December 31, 1915, were largely in excess of current liabilities.

Directors.—December 31, 1915: W. T. Western, chairman; James Anderson, W. Galwey, Ross Pinsent, F. C. im Thurn; secretary, G. Proctor, 52 Moorgate Street, London, E. C.

CORDOBA LIGHT AND POWER CO.

Incorporated in Maine, U. S. A., to produce and distribute electricity for light, etc., in the Province of Cordoba, Argentina. Concession expires 1948.

Capitalization.—$500,000 12 per cent cumulative preferred stock and $800,000 ordinary stock. All stock owned by Cordoba Light, Power & Traction Co. (Ltd.).

DEVELOPMENT CO. OF SANTA FE (LTD.).

Registered 1909. Acquired from the Santa Fe Land Co. (Ltd.) 416,798 acres of land situated in the Province of Santa Fe. The cost of this land was £242,144; buildings, fencings, clearing, etc., cost £23,275, and live stock cost (to June 30, 1915) £46,264 (actual value £58,700). The company's principal business is the raising of cattle, of which 12,606 head were owned as of June 30, 1915, as compared with 6,284 head owned December 31, 1913, and 4,983 head December 31, 1912; 758 horses were also owned as of June 30, 1915.

Capitalization.—Authorized, £400,000 shares (par £1); outstanding, £355,920.

There is a contingent liability of 5s. per acre in respect of 107,923 acres (south of River Salado) in the event of the construction of a railway through such area before September, 1919.

INCOME ACCOUNTS.

Items.	1912	1913	January, 1914, to June 30, 1915.
Profits	[a] £3,320	£7,649	£8,244
Expenses	6,673	6,620	12,131
Surplus or loss	−3,353	+1,029	−3,887

[a] No cattle sold during the year.

No dividends are paid.

Directors.—Alfred G. Gumpert, Frank W. H. Jones, Louis H. Kirk, Brig. Gen. the Hon. F. C. Stanley, D. S. O.; acting secretary, G. Slane. Address: 792 Salisbury House, London, E. C.

FORESTAL LAND, TIMBER & RAILWAYS CO. (LTD.).

Registered in England, 1906, to acquire and develop the business of a local company. Properties now owned consist of more than 4,800,000 acres of freehold land and 630,000 acres of leasehold land in the Province of Santa Fe and the Chaco, Argentina. On the properties are extensive quebracho forests, live stock, light railways, etc. Factories to manufacture tanning extracts, etc., are owned. To develop the cattle business, the company recently purchased about 5 square leagues of alfalfa land at a cost of £175,589. The company has also acquired the properties of the Argentine Quebracho Co., as well as a large factory, with additional real estate in New York, from the New York Tanning Extract Co. The American company has been incorporated as the New York Quebracho Extract Co.

CAPITALIZATION DEC. 31, 1915.

Securities.	Authorized.	Outstanding.
Preference shares (par £1), entitled to a cumulative dividend of 6 per cent per annum and 25 per cent of the surplus profits available for dividend	£1,612,500	£1,545,850
Ordinary shares (par £1)	1,612,500	1,545,849
5 per cent first-mortgage refunding debentures	1,200,000	[a] 1,158,700
5 per cent mortgage debentures, 1914	1,200,000	[a] 1,186,400
Total	5,625,000	5,436,799

[a] Balance retired through sinking funds.

Reserves, £772,925; depreciation account, including sums set aside for redemption of debentures, £634,170; bills payable, etc., £760,306; cash, £351,940; treasury bills and war loan owned, £521,461; bills receivable, etc., £974,250; stores and materials, £240,692; extract and felled timber, £1,045,952; live stock, £495,949; investments at cost, £567,358; property (timber, lands, railways, etc.), £4,405,918.

INCOME ACCOUNTS (CALENDAR YEARS).

Items.	1913	1914	1915
Profits on trading, dividends, interest, etc	£669,479	£615,114	£1,281,660
Surplus, after depreciation, reserves, interest, etc	383,362	234,065	900,947
Special reserve for excess profits, duty, income tax, war, and other contingencies	....	....	200,000
Preference dividend appropriation	[a] 149,604	[a] 123,745	[a] 194,800
Ordinary dividend appropriation	[b] 205,359	[b] 92,982	[b] 306,147
To special reserve	....	....	200,000
For other purposes	28,397	17,338	....
No balance.			

[a] Year 1913: Paid, £148,780 (11 per cent); carried forward, £7,776. Year 1914: Paid, £123,668 (8 per cent); carried forward, £7,853. Year 1915: Paid, £185,502 (12 per cent); carried forward, £17,151.

[b] Year 1913: Paid, £202,881 (15 per cent); carried forward, £23,305. Year 1914: Paid, £92,750 (6 per cent); carried forward, £23,536. Year 1915: Paid, £278,253 (18 per cent); carried forward, £51,430.

Directors.—Great Britain: Baron Emile B. d'Erlanger, chairman; Joseph C. Baldwin, jr., managing; Charles E. Gunther, Louis H. Kirk, Hon. Sir Arthur Lawley, G. C. S. I., Campbell P. Ogilvie, Baron Frederic Portalis, Thomas E. Preston, Leon Rueff, Brig. Gen. the Hon. F. C. Stanley, D. S. O. In Argentina: Victor Nerig, chairman; Enrique Berduc, Ernest Jewell, Thomas Lloyd, Vernon Lindop; secretary, O. J. Buxton. Office: 149 Leadenhall Street, London, E. C.

HARRODS (BUENOS AIRES) (LTD.).

This company, controlled and operated by the management of Harrods (Ltd.), of London, was incorporated 1913 to acquire general stores in Buenos Aires. Freehold land and buildings are owned in Calle Florida, Calle Paraguay, Calle San Martin, and Calle Cordoba, these properties being carried on the books at a valuation of £615,930; fixtures, fitting, plant, etc., are carried at £176,425; stocks on hand and in transit, £407,005; shares of the Sociedad Anónima Thompson Muebles (Ltd.), £118,369; and inauguration outlays, including the acquisition of good will of the business of Harrods (South America), £144,589.

Capitalization.—Preference shares, 6½ per cent cumulative (par £1), £600,000; ordinary shares, 10 per cent (par £1), £900,000; deferred shares (par 1s.), £12,000; total, £1,512,000. Mortgages on property at Buenos Aires, £82,514. Cash, bills, etc., receivable, Treasury bills, etc., £64,860; sundry creditors, £74,728.

No dividends have as yet been paid on the preference shares. After the ordinary shares have received 10 per cent the deferred shares, all of which are owned by Harrods Stores (London), are entitled to the balance.

Profits for the year ended August 31, 1915, amounted to £8,814, from which £6,467 was provided for depreciation, replacements, etc. There was a debit balance to profit and loss as of August 31, 1915, of £51,346.

Sales from August 1, 1915, to November, 1915, showed an increase of about 77 per cent.

Directors.—Sir Alfred J. Newton, Herbert Bennett, Edgar Cohen, William Mendel; managing directors, Richard Burbidge, R. W. Burbidge; secretary, R. H. Griffith, 87–135 Brompton Road, London, S. W., and Buenos Aires.

LA PLATA ELECTRIC TRAMWAYS (LTD.).

Registered 1909. Acquired the La Plata & Ensenada Tramways Co. (registered 1890), which transferred its concession, recently obtained, to the successor company. This concession provided that in return for the electrification of the lines for 10 years all provincial and municipal taxes would be waived; thereafter the company is to be taxed 4 per cent for the first five years and 5 per cent for the remaining period of the concession. The mileage operated is 33. The company, in common with nearly all of the tramway companies in Argentina, has suffered greatly on account of the war.

Capitalization.—December 31, 1915: Ordinary shares, £250,000 (par £1); preference shares, £200,000 (par £1); 5 per cent debenture stock, authorized £200,000, outstanding £100,450. The preference shares are entitled to cumulative dividends of 6 per cent per annum. After 6 per cent has been paid on the ordinary shares 19 per cent of the profits revert to the directors.

Dividends.—1909 and 1910, 6 per cent each; 1911, 6 per cent (3 per cent paid during 1911, 1½ per cent during 1912, and 1½ per cent during 1913); 1912, 3½ per cent (paid during 1913); none since.

INCOME ACCOUNTS (CALENDAR YEARS).

Items.	1913	1914	1915
Miles operated	29	29	30
Gross receipts	£62,324	£56,186	£52,821
Expenditures	45,252	44,273	41,455
Net receipts	17,072	11,913	11,365
Balance brought forward	....	330	6,614
Interest, etc	....	5,629	5,837
Surplus	....	6,614	12,142

From the surplus for 1915, £3,000 was credited to reserve fund.

Directors.—W. F. Hamilton, K. C., chairman; Sir J. S. Harmwood Banner, M. P., W. T. Weston, W. M. Wilson; secretary, H. S. M. Woodrow. Office: 52 Moorgate Street, London, E. C. Manager: Valentine Brown, La Plata, Argentina.

LEACH'S ARGENTINE ESTATES (LTD.).

Incorporated 1912. Owns properties in Argentina, including cane and alfalfa plantations, cleared lands, uncultivated lands, sugar factory, sawmills, a light railway with rolling stock, etc. Property carried on books March 31, 1915, at a valuation of £1,777,357. The total area of the property is about 500,000 acres, located in the Province of Jujuy.

CAPITALIZATION.

Securities.	Authorized.	Outstanding.
Preference shares (par £1), 6 per cent cumulative (also entitled to 25 per cent of surplus profits available for dividends)	£500,000	£350,000
Ordinary shares (par. £1), entitled to 6 per cent noncumulative and 50 per cent of the surplus profits available for dividends	500,000	475,000
Deferred shares, entitled to 25 per cent of surplus profits available for dividends	52,500	52,500
First-mortgage debentures, 5½ per cent	1,000,000	[a] 888,400
Total	2,052,500	1,765,900

[a] £950,000 issued; balance retired through sinking fund.

DIVIDENDS.

	1913	1914	1915
	Per cent.	*Per cent.*	*Per cent.*
Preference	6	6	6
Ordinary	6	6	None.

INCOME ACCOUNTS.

Items.	Year ended March 31—		
	1913	1914	1915
Profits (net)	£146,233	£134,558	£110,223
Depreciation, interest, London expenses, fees, debenture interest, etc	89,442	90,768	109,751
Surplus	56,791	43,790	472

As of March 31, 1915, stores and materials were valued at £70,092; animals, etc., at £66,443; sugar, alcohol, and coffee, £229,498; bills receivable, etc., £243,582; cash, £67,346; bills payable, £177,952; creditors and debit balances, £507,440 (since reduced considerably); reserves, £22,790.

The sugar output has been as follows: 1912, 10,642 tons; 1913, 18,121 tons; 1914, 26,461 tons.

Directors.—William E. Leach, chairman; Baron F. A. d'Erlanger, vice chairman; John C. Gibson, Pierre Girod (Paris), Baron Frederic Portalis (Paris), Samuel Taylor (Great Britain), Walter Leach, Stephen Leach, Victor Negri (Buenos Aires); acting secretaries, T. H. Darton, W. F. Vaxley. Office: 8 Crosby Square, London, E. C.; also Paris and Buenos Aires.

PARANA LIGHT & POWER CO.

This company lights the city of Parana, Province of Entre Rios, Argentina. The city is the center of a rich grazing district and is populated largely with German, Swiss, and Italian colonists. Its population is 40,000. The property is operated by the J. G. White Co. (Ltd.) as managers. The public lighting contract expires in 1920.

Capitalization.—$500,000 (United States gold) shares and $295,000 debentures, all owned by the International Light & Power Co. (Ltd.).

Income account.—Year ended June 30, 1915: Net operating earnings, £11,998 (£11,317 for 1913–14); renewals, sinking fund, etc., £4,202; surplus carried to the balance sheet of the International Light & Power Co. (Ltd.), £7,796 (£6,009 for 1913–14).

Directors.—See International Light & Power Co. (Ltd.), page 536.

PATAGONIAN SHEEP FARMING CO. (LTD.).

This company was incorporated 1908 as a reconstruction of a company of a similar title and description, which was registered in 1897. Large farms and grazing areas have been acquired in the Territory of Santa Cruz, Patagonia, Argentina, and in the Territory of Magallanes, Chile. The company, which has only a limited number of shareholders, does an extensive sheep-ranching business.

Capitalization.—Ordinary shares (par £1), authorized £200,000, outstanding £180,000; £23,000 debentures were recently outstanding.

Income account.—Not made public.

Directors.—W. G. Waldron, A. Waldron, G. L. Waldron, E. J. Mathews, W. L. Woods. Office: 101 Leadenhall Street, London, E. C.

RIVER PLATE ELECTRICITY CO. (LTD.).

Incorporated 1902. Acquired properties formerly operated by the River Plate Electric Light & Traction Co., which included electric undertakings and other properties in Buenos Aires, La Plata, and Tucuman. Properties at Ensenada were also acquired. The Buenos Aires and Tucuman properties have since been disposed of, the former to the German Transoceanic Co., of Berlin, and the latter to the Tucuman Tramways, Light & Power Co. The German company paid to the River Plate Electricity Co. £150,000 5 per cent obligations, of which £138,800 remained outstanding December 31, 1915. No interest is now being paid on these obligations owing to the war. The Tucuman Tramways Co. issued to the River Plate Electricity Co., in part payment for properties acquired, £66,607 of its 5 per cent debenture stock and £21,000 shares of the Argentine Electricity Co. (Ltd.). In addition, the River Plate Electricity Co. owns debenture stock and shares of the National Tramways of La Plata, La Plata Electric Tramways, etc.

Capitalization.—£125,000 6 per cent noncumulative preference stock; £150,000 ordinary stock; £25,000 preference shares (par £1); £25,000 ordinary shares (par £1); £200,000 5 per cent debenture stock (£250,000 authorized), interest payable January and July, redeemable at company's option on six months' notice.

Income account.—Net revenue, 1915, £38,713; balance carried forward, £59,226; interest on 5 per cent debenture stock, £10,000; surplus, £49,226; preference dividend (6 per cent), £8,807; ordinary dividends (7 per cent), £12,632; provisions for bad debts and income tax, £10,000; balance, £18,387. Dividends on ordinary stock: 1906, 2½ per cent; 1907, 6 per cent; 1908, 8 per cent; 1909, 9 per cent; 1910 to 1913, 10 per cent; 1914, 8 per cent; 1915, 7 per cent. Reserves December 31, 1915, £226,898; current assets, £47,820; current liabilities, £66,917.

Directors.—M. W. Mattinson, K. C., chairman; Robert Miller, Maj. George Pringle; secretary, T. S. Hamilton, 62 New Broad Street, London, E. C.; general manager, V. Lindop, M. I. E. E., La Plata, Argentina.

RIVER PLATE TELEGRAPH CO. (LTD.).

Capitalization.—£75,000 shares, par £10, of which £42,500 is fully paid and £32,500 is £4 paid. Controlled by Western Telegraph Co. (which see).

Income account.—Not published.

Secretary: E. S. Hodson, 5 Royal Bank Place, Glasgow, Scotland.

ROSARIO DRAINAGE CO. (LTD.).

Registered 1897 to take over the assets of the Rosario City Improvement Co. (Ltd.). The company has the concession to drain the city of Rosario, this concession expiring 1974, at which time the property and works revert to the city without reimbursement. The city may purchase the undertaking at an earlier date under certain conditions.

CAPITALIZATION, JUNE 30, 1915

Securities.	Authorized.	Outstanding.
Preference shares, 6 per cent cumulative (par £10)	£120,000	£120,000
Ordinary shares (par £1)	374,000	369,200
5 per cent prior lien debenture stock, due 1928	150,000	[a] 46,000
4 per cent first debenture stock, due 1930	200,000	148,500
4 per cent second debenture stock, due 1930	250,000	225,720
Total	1,094,000	909,420

[a] £62,000 debentures have been issued, of which £16,000 have been retired through sinking-fund operations.

Interest on the prior lien debenture stock is payable January and July, and a sinking fund will redeem the issue at 105 by 1928. Interest on the first debenture stock is payable January and July, and interest on the second debenture stock is payable annually in October; both issues are repayable at par in 1930 and at 110 if the company decides to redeem them at an earlier date.

Dividends at the rate of 6 per cent per annum are being paid regularly on the preference shares; dividends on the ordinary shares during recent years have been as follows: 1910–11, 3 per cent; 1911–12 and 1912–13, 4 per cent; 1913–14 and 1914–15, 3 per cent.

INCOME ACCOUNTS.

Years ended June 30—	Number of house connections.	Gross revenues.	Working expenses.	Net revenues.
1906	3,793	£22,412	£8,471	£13,941
1910	5,272	37,883	10,930	26,953
1911	5,702	46,633	11,996	34,637
1912	6,134	49,359	13,108	36,252
1913	6,344	53,438	12,645	40,792
1914	6,466	56,438	12,983	43,455
1915	6,925	57,576	12,759	44,817

To the net revenues for 1914–15, £44,817 (as above), should be added £10,134 brought forward from 1913–14. From this total there were deducted all interest and other fixed charges, also £6,758 dividend on the cumulative preference shares, leaving a balance of £26,795. Of this balance £11,076 was appropriated for the dividend (3 per cent) on the ordinary shares and £2,500 for the reserve fund, and £13,219 was carried forward to 1916.

Directors.—James Anderson, chairman; Philip W. Carr, Follett Holt; secretary, G. Proctor, 52 Moorgate Street, London, E. C.

SANSINENA FROZEN MEAT CO. (COMPAÑÍA SANSINENA DE CARNES CONGELADAS).

Registered 1891 in Argentina to carry on a business in frozen and chilled meat, largely for export. Founded 1881. Important freezing establishments owned at Buenos Aires and Bahia Blanca. Controls the Sociedad Frigorifica Uruguaya, at Montevideo.

Capitalization.—1916 (figures in Argentine gold): Preference shares, 6 per cent cumulative, $1,500,000 o/s (these shares are largely held in Antwerp, Belgium); ordinary shares, $4,346,600 o/s, including $1,346,600 o/s shares issued in 1916, of which $450,000 o/s were issued as a special dividend on ordinary shares. A total of $653,400 o/s ordinary shares remain unissued. In addition, $750,456 o/s 5 per cent debentures were outstanding December 31, 1915, interest May and November, principal repayable at par on or before May 1, 1923.

Dividends.—1901, 22 per cent; 1902, 50 per cent; 1903, 12½ per cent; 1904 to 1907, 10 per cent; 1908 and 1909, 12 per cent; 1910, 15 per cent; 1911, 10 per cent; 1912 and 1913, none; 1914, 10 per cent; 1915, 10 per cent regular and 15 per cent extra (paid in stock).

INCOME ACCOUNTS.

Items.	1913	1914	1915
	Argentine gold pesos.	*Argentine gold pesos.*	*Argentine gold pesos.*
Credit balance forward	5,809	None.	25,794
Merchandise profits or losses	−746,966	+1,267,048	+1,464,714
Land profits	22,736	14,854	None.
Expenses, depreciation, etc.	273,254	330,481	312,804
Surplus or deficit	−991,673	+951,421	+1,177,703

NOTE.—Reserves as of Dec. 31, 1915, 1,306,606 Argentine gold pesos.

EXPORTS OF MEAT.

	1912	1913	1914	1915
Carcasses of mutton	719,762	507,919	671,559	490,283
Quarters of beef	472,487	401,412	355,993	362,427

Officers and directors.—President, vacant December 31, 1915; vice president, Alfredo G. Luro; directors, Miles A. Pasman, Samuel Hale Pearson, Rufino F. Luro, Carlos A. Tornquist; auditor, Gmo. C. Pasman; manager, Lino Landajo; manager in Europe, W. D. Barnett. Office: 19–20 West Smithfield, London, E. C., and Calle San Martin 132, Buenos Aires.

SOCIEDAD ANÓNIMA BODEGAS ARIZU.

This company—incorporated 1907—owns extensive vineyards in the Province of Mendoza, Argentina. Distilleries are also owned.

Capitalization.—$10,000,000 m/n (Argentine paper) authorized, $6,000,000 m/n outstanding (par $100 m/n); £200,000 6 per cent first-mortgage debentures authorized, £146,680 outstanding (sold at 94 per cent); sinking fund, 2 per cent per annum. Properties stated (December, 1913) to be valued at £763,508.

Income account.—Net profits, 1911, £20,161; 1912, £56,925; 1913, £38,475; 1914 (deficit), $157,196 m/n; debit balance December 31, 1914, $255,844 m/n.

Directors.—B. Arizu, chairman; R. Mercado, J. Arizu (secretary and treasurer), F. T. Jacoby, R. W. Roberts. Office: Mendoza, Argentina.

UNITED RIVER PLATE TELEPHONE CO.

Registered 1886.

Capitalization.—Five per cent cumulative preference shares, £200,000 (par £5); ordinary shares, £1,620,000; 4½ per cent debenture stock due 2006 (callable at 105), interest January and July, £300,000; total capitalization, £2,120,000. Cost of property and real estate, £2,807,727; other (current) assets, £339,910; reserves, £925,602; credit balance to profit and loss, £128,234.

INCOME ACCOUNTS (CALENDAR YEARS).

Items.	1914	1915
Gross earnings	£630,652	£641,581
Operating expenses	455,346	447,810
Net profit	175,306	193,771
Interest	13,500	13,500
Surplus	161,806	180,271

In 1915 £20,000 was carried to reserve fund, £19,000 to depreciation of securities account, and £2,000 to staff provident fund.

Dividends.—Five per cent per annum is paid on preference shares; 8 per cent per annum has been paid on the ordinary shares since 1904.

Directors.—Sir George Franklin, chairman; Sir John Gavey, C. B., George Keith, Sir Frederick Green, Eustace Quilter; secretary, A. H. Dawburn. Office: 5 London Wall Buildings, Finsbury Circus, London, E. C.

QUOTATIONS AND DIVIDENDS OF SECURITIES.

The following table, taken from the Review of the River Plate, shows the quotations and dividends of securities listed on the Stock Exchange at Buenos Aires, August 30, 1917:

BANKS AND INDUSTRIAL ENTERPRISES.

Names of enterprises.	Share.		Last dividend.		Quotations Jan. 1, 1917, to Aug. 30, 1917.			Date of last quotation.
	Class.	Value.	Year ended—	Per cent.	Highest.	Lowest.	Last.	
BANKS.		*Argentine pesos.*						
Provincia de Buenos Aires.	Ord.	100m/n	Dec. 31, 1916	6½	125.00	108.00	125.00	Aug. 9, 1917
Frances del Rio de la Plata	Ord.	100o/s	Dec. 31, 1915	nil.	48.00	19.00	41.00	Aug. 30, 1917
Nuevo Italiano	Ord.	100m/n	June 30, 1917	12	215.00	205.00	215.00	Aug. 9, 1917
Español del Rio de la Plata	Ord.	100mn	do	5	115.00	104.00	112.00	Aug. 30, 1917
Italia y Rio de la Plata	Ord.	100o/s	Dec. 31, 1915	5	90.00	82.00	85.00	July 5, 1917
Galicia y Buenos Aires	Ord.	100m/n	do	4	71.80	66.80	66.80	Aug. 30, 1917
El Hogar Argentino	Deb.	100m/n	Aug. 31, 1916	8	101.00	101.00	103.00	Aug. 9, 1917
El Hogar Argentino (80 per cent paid).	Cer.	250m/n	do	8	160.00	135.00	140.00	Aug. 30, 1917
Comercial Italiano	Ord.	100m/n	Dec. 31, 1915	6½	100.00	95.00	97.00	Aug. 23, 1917
Popular Argentino	Ord.	20m/n	Apr. 30, 1916	9	27.00	25.00	26.50	Aug. 9, 1917
INDUSTRIAL ENTERPRISES.								
Azucarera Argentina	Ord.	100o/s	Dec. 31, 1915	10			130.00	Nov. 11, 1915
Azucarera Tucumana	Ord.	100o/s	Mar. 31, 1916	nil.			98.00	May 15, 1913
Refinería Argentina	Ord.	100o/s	Apr. 30, 1917	6			97.50	Sept. 17, 1912
Sansinena Carnes Congeladas.	Ord.	100o/s	Dec. 31, 1916	25	150.00	125.00	150.00	Aug. 30, 1917
Smithfield & Argentine Meat.	Ord.	5.04o/s	do	[a] 10	5.35	4.75	4.85	June 28, 1917
Mercado Central de Frutos.	Ord.	50o/s	June 30, 1917	12	85.50	74.00	83.00	Aug. 9, 1917
Puerto San Nicolás	Ord.	45m/n	do	nil.	26.30	15.00	24.80	Aug. 30, 1917
Muelles de la Plata	Ord.	25o/s	Dec. 31, 1915	1.6			18.00	Feb. 5, 1914
Catalinas Warehouses & Mole.	Ord.	10.08o/s	do	nil.	3.00	2.50	3.00	Aug. 9, 1917
La Germania Destilería, etc.	Pfd.	100o/s	June 30, 1917	7	102.00	100.00	102.00	June 21, 1917
Do	Ord.	100o/s	do	12			150.00	Aug. 30, 1917
Cervecería Palermo	Ord.	100m/n	June 30, 1916	nil.			100.00	July 17, 1913
Cervecería Rio Segundo	Ord.	500m/n	do	3			600.00	Oct. 10, 1912
La Martona Lechería etc.	Ord.	100o/s	Dec. 31, 1915	[illegible]			35.00	June 26, 1913
Introductora de Buenos Aires.	Ord.	100o/s	do	10	125.00	95.00	125.00	Aug. 23, 1917
Industrial Paraguaya	Ord.	5o/s	Feb. 28, 1916	nil.			2.80	Oct. 5, 1916
River Plate Quebracho Co.	Ord.	1o/s	Dec. 31, 1915	nil.	1.05	.90	1.00	Aug. 9, 1917
Campos y Quebrachales Puerto Sastre.	Ord.	4o/s	Dec. 31, 1916	25	3.70	3.00	3.25	Aug. 30, 1917
Quebrachales Fusionados.	Ord.	25m/n	do	60	93.00	67.00	93.00	Do.
Cia. General Polladora	Ord.	25m/n	Dec. 31, 1915	12			34.00	Sept. 15, 1913

[a] And 5 per cent bonds.

BANKS AND INDUSTRIAL ENTERPRISES—Continued.

Names of enterprises.	Share.		Last dividend.		Quotations Jan. 1, 1917, to Aug. 30, 1917.			Date of last quotation.
	Class.	Value.	Year ended—	Per cent.	Highest.	Lowest.	Last.	
INDUSTRIAL ENTERPRISES—continued.		*Argentine pesos.*						
Guatrache Land Co	Ord.	10.08o/s	June 30, 1916	......	....	....	2.20	Dec. 28, 1916
Tierras del Oeste	Ord.	20m/n	.....do	nil.	....	....	14.00	Aug. 2, 1917
Quebrachales Paraguayos	Ord.	1o/s	.....do	4	....	....	1.55	Aug. 24, 1916
Trust Alto Paraguay	Ord.	1o/s	.....do	nil.	....	....	1.45	Aug. 23, 1917
Gas de la Plata	Ord.	100m/n	Dec. 31, 1915	2.5	....	....	125.00	Jan. 30, 1913
Anglo-Argentina de Electricidad.	Ord.	100m/n	July 31, 1916	nil.	....	....	35.00	July 26, 1917
Cia. Industrial de Electricidad.	Ord.	100o/s	Dec. 31, 1915	5	....	....	90.00	June 11, 1914
La Franco-Argentina de Seguros.	Ord.	50m/n	Dec. 31, 1916	16	130.00	120.00	126.00	July 12, 1917
La Edificadora	Ord.	100m/n	Mar. 31, 1916	6	75.00	71.50	72.50	Do.
Argentina de Edificación	Ord.	100m/n	Dec. 31, 1915	nil.	39.00	34.00	33.00	Aug. 2, 1917
Primitiva de Bolsas	Ord.	100m/n	Aug. 31, 1916	30	....	....	235.00	Aug. 30, 1917
General de Fósforos	Ord.	100m/n	Dec. 31, 1915	25	320.00	305.00	320.00	July 12, 1917
S. A. Billetes de Banco	Ord.	100m/n	Nov. 30, 1915	nil.	....	....	45.00	Dec. 21, 1915
Argentina de Papel	Ord.	50m/n	Dec. 31, 1916	12	54.00	45.50	54.00	Aug. 9, 1917
Fábrica de Papel (Casati)	Ord.	100m/n	June 30, 1916	7	....	....	112.00	June 11, 1913
Salinas Hermanos Fábrica de Bolsas	Ord.	100m/n	Aug. 31, 1916	20	177.00	128.00	177.00	Aug. 30, 1917
Fundición y Talleres La Unión.	Ord.	100m/n	Apr. 30, 1917	8	....	....	107.00	Nov. 20, 1913
La Ibero Platense	Ord.	100m/n	Dec. 31, 1916	nil.	37.00	29.50	32.00	Aug. 23, 1917
Bodegas Tomba	Ord.	100o/s	Feb. 28, 1916	nil.	....	....	138.00	May 29, 1913
M. S. Bagley & Cia. (Ltda.)	Ord.	100o/s	Aug. 31, 1916	8	....	....	120.00	Dec. 16, 1915

NATIONAL, PROVINCIAL, AND MUNICIPAL BONDS, STOCKS, AND CEDULAS.

Bonds, stocks, and cedulas.	Coupons due.	Interest.	Sinking fund.	Quotations Jan. 1, 1917, to Aug. 30, 1917.			Date of last quotation.
				High.	Low.	Last.	
		Per ct.	*Per ct.*				
Province of Buenos Aires Internal Conversion.	Jan., July	2½	1	32.10	30.00	31.70	Aug. 30, 1917
Deuda Interna Provincia Buenos Aires.	Jan., Apr., July, Oct.	5	1	70.00	63.00	68.20	Do.
Deuda Interna Provincia Buenos Aires.	.....do	6	1	....	....	88.00	July 19, 1917
Deuda Interna Provincia Buenos Aires, serie 2.	.....do	6	....	83.00	77.30	81.00	Aug. 9, 1917
Deuda Interna Provincia Buenos Aires, serie 3.	.....do	6	....	82.00	77.00	81.90	July 26, 1917
Dueda Consolidada Interna Provincia Santa Fe.	.....do	6	1	85.50	78.00	81.00	Aug. 30, 1917
Do	Mar., June, Sept., Dec.	6	1	....	....	81.10	Apr. 19, 1917
Bonos Edificación Escolar Santa Fe.	Jan., Apr., July, Oct.	7	5	....	....	94.00	Dec. 31, 1913
Bonos Edificación Pública Santa Fe.	.....do	7	5	....	....	92.50	Do.
Consolidada Provincia Entre Rios.	.....do	5	1	....	....	60.00	Aug. 24, 1916
Deuda Municipal Buenos Aires.	.....do	6	1	....	....	95.00	May 17, 1917
Empréstito Municipal	May, Nov	6	1	....	....	91.00	Aug. 24, 1916
Empréstito Municipal Teatro Colon.	Feb., Aug	6	1	....	....	85.00	Mar. 15, 1917
Banco Provincia Buenos Aires con Obligaciones.	Jan., Apr., July, Oct.	5	½	71.00	66.20	70.20	Aug. 23, 1917
Credito Argentino Interno	Mar., June, Sept., Dec	5	1	90.00	87.30	89.70	Aug. 30, 1917
Do	Feb., May, Aug., Nov.	5	1	89.70	86.80	87.20	Do.
Do	....	5	....	....	....	87.00	June 21, 1917

NATIONAL, PROVINCIAL, AND MUNICIPAL BONDS, STOCKS, AND CEDULAS—Contd.

Bonds, stocks, and cedulas.	Coupons due.	Interest.	Sinking fund.	Quotations Jan. 1, 1917, to Aug. 30, 1917.			Date of last quotation.
				High.	Low.	Last.	
		Per ct.	*Per ct.*				
Bonos de Edificación Escolar Provincia Buenos Aires.	Jan., Apr., July, Oct.	6	1	....	....	76.00	June 21, 1917
Empréstito Municipal Pavimentación.	.....do............	5	1	90.00	79.00	89.50	Aug. 30, 1917
Bonos Municipales Pavimentación.	June, Dec.........	5	7	77.90	72.00	75.50	Do.
Province of Buenos Aires Loan, 3½ per cent.	Jan., July.........	3	....	44.80	40.50	44.70	July 26, 1917
Obras de Salubridad........	Mar., June, Sept., Dec.	5	1	....	....	93.50	Dec. 21, 1916
Province of Tucuman Loan.	.....do............	6	4	....	....	89.00	Dec., 1912.
Rosario Municipal Bonds...	Jan., July.........	6	2	....	....	71.50	May 24, 1915
Pavimentación de Mendoza.	Apr., Oct.........	8	20	....	....	89.50	Dec., 1912
National Cedulas:							
Series H...............	June, Dec.........	7	1	105.00	102.00	104.00	Aug. 30, 1917
Series J...............	Feb., Aug.........	6	1	104.80	96.00	97.50	Aug. 16, 1917
Series K...............	.....do............	5	1	92.00	85.00	88.30	Aug. 30, 1917
Series L...............	Mar., Sept.........	6	1	101.50	95.50	101.30	Do.
Cedula Argentina............	Jan., July.........	6	1	98.80	93.10	96.30	Do.
Cedula Argentina, first series	May, Nov.........	6	1	96.50	91.00	95.50	Do.
Cedula Argentina, second series.	.....do............	6	1	95.10	91.10	94.30	Do.
Bonos Hipotecarios Banco de la Provincia.	Jan., July.........	6	1	96.50	91.50	94.00	Do.

RETURNS FROM RAILWAY OPERATIONS.

The following table, taken from the Review of the River Plate, shows the returns from the operations of Argentine railways for the fiscal years ended June 30, 1916 and 1917:

Railways.	Miles open.		Last working expenses.	Returns from operations for year ended June 30—		Increase or decrease.
	1916	1917		1916	1917	
			Per cent.			
Buenos Aires Great Southern............	3,792	3,792	57.04	£5,541,000	£5,728,000	+£187,000
Buenos Aires Pacific............	3,535	3,535	61.16	4,645,000	4,414,000	−231,000
Central Argentine............	3,307	3,305	58.43	5,725,000	5,237,100	−487,900
Buenos Aires Western............	1,867	1,870	58.22	2,719,000	2,513,000	−206,000
Buenos Aires Midland............	322	322	54.76	126,600	157,900	+31,300
Entre Rios Railways............	831	831	54.51	613,000	641,700	+28,700
Argentine Northeastern............	752	752	60.55	323,800	389,100	+65,300
Cordoba Central Railway system........	1,186	1,205	71.59	1,543,991	1,562,000	+18,009
				$m/n	*$m/n*	*$m/n*
Rosario-Puerto Belgrano............	493	493	79.77	2,687,200	2,314,700	−372,500
Province of Santa Fe............	1,181	1,192	61.16	11,303,000	13,555,000	+2,252,000
Province of Buenos Aires............	790	790	....	7,865,976	8,895,798	+1,029,822
Central Northern............	3,000	3,045	93.58	[a] 8,167,788	[a] 9,108,318	+940,530
Buenos Aires Central............	252	252	48.50	3,328,459	3,385,142	+56,683

[a] For *six months* ended June 30.

NOTE.—Operations of the Central Railway of the Chubut Co. and of certain Government railways are not included in the above table

INCREASED WORKING EXPENSES OF RAILWAYS.

The following table from the statement of railway managers, submitted in connection with a request for rate increases (1917), shows the increase in working expenses through enhanced cost of fuel and materials in 1918 compared with and on the basis of the traffic movement during the financial year 1912–13:

Items.	Tons.	Price per ton.	Total cost.	Increase in expenses.
FUEL.		$m/n	$m/n	$m/n
Consumption and cost during financial year 1912–13	138,051	28.84	3,429,091	
Present cost, assuming same traffics and consumption as in 1912–13	138,051	78.68	10,861,853	7,432,762
MATERIALS.				
Total cost of materials used on revenue account during financial year 1912–13			3,005,236	
Present cost of materials placed in Buenos Aires, representing increase of 107 per cent over prices ruling in 1912–13			6,220,839	3,215,603
Total increase in expenses				10,648,365

BOLIVIA.

ANGLO-BOLIVIAN RUBBER ESTATE (LTD.).

Registered 1910 to acquire a large rubber estate (900,000 acres) located in the province of Valasco, Bolivia.

Capitalization.—Authorized, £62,500; outstanding, £55,677; par, 1s.

Report for year ended June 30, 1915 (published December, 1915), stated that a profit of £2,438 was earned and that a dividend of 2½ per cent was paid. In 1917 the dividend rate was 12½ per cent.

Directors.—W. R. Gaff, chairman; A. Gray Wallis, A. B. Shaw, James Greenless. Office: 54 New Broad Street, London, E. C.

ARAMAYO FRANCKE MINES (LTD.).

Registered 1906 to acquire mining properties at Tupiza, Bolivia, as well as mines, metallurgical works, etc., situated in north and south Chichas, Bolivia. The cost of these properties was £494,090 in fully paid shares. In 1908 properties covering the Chorolque Mountain were acquired for £139,999 cash. Tin is the principal product, although silver, bismuth, copper, and wolfram are mined. Tin production: 1910–11, 3,818 tons; 1911–12, 4,105 tons; 1912–13, 3,694 tons; 1913–14, 3,442 tons; 1914–15, 2,060 tons; 342 tons of copper matte were sold in 1913–14 and 111 tons in 1914–15.

Capitalization.—£600,000 shares (par £1); £100,000 6 per cent debentures were issued 1909 but have been practically all redeemed. Shares sold in 1914, high 1⅞, low 1¼; in 1915, high 1½, low 1.

Dividends.—1910–11, 12½ per cent; 1911–12, 15 per cent; 1912–13, 17½ per cent; 1913–14, 19 per cent; 1914–15, 7½ per cent; 1915–16, 10 per cent; 1916–17. 30 per cent.

The report for the year ended May 31, 1915, indicated a loss of £36,444 after £20,000 was provided with which to redeem debentures. In addition. £44,783 dividends were paid from credit balance forward. The credit balance to be carried forward to 1916 account was £9,139. The profit earned in 1913–14 was £92,077, after £30,000 was provided for debentures redeemed. It is expected that better results will be achieved during 1915–16. As of May 31, 1915, the stock of tin, etc., was valued at £278,750, while large additional assets were held. In 1916 and 1917 net profits were £167,557 and £225,315, respectively.

Directors.—F. A. Aramayo, chairman; J. D. Campbell, B. Dale, R. G. Ribon, L. A. Kensington, I. Gutierrez-Ponce. General manager: M. Roberts. Office: 148½ Fenchurch Street, London, E. C.

BERENGUELA TIN MINES.

Registered 1905. Owns 447 acres of tin lands near Berenguela, Bolivia. Output of tin: 1912–13, 153 tons; 1913–14, 202 tons; 1914–15, 193 tons.

Capitalization.—£20,000 shares authorized; £6,938 issued; par £1.

Profit.—1914–15, £475; carried forward, £3,617.

Directors.—J. MacAndrew, chairman; H. M. Read; secretary, G. C. Elgee, Leadenhall Buildings, London, E. C. Manager: C. L. Price, Berenguela, Bolivia.

COROCORO UNITED COPPER MINES (LTD.).

Registered 1909. Owns extensive copper properties in Corocoro, in the La Paz district, Bolivia. More than 500 mines and a reduction plant are owned. The Corocoro branch of the Arica-La Paz Railway runs to the mines.

Capitalization.—Authorized, £700,000 shares (par £1); outstanding, £673.607 shares.

Income account.—Net profit for the year ended June 30, 1915 (after writing £2,000 off development, and providing £10,000 for loss in exchange and for underwriting), £22,259, as against £23,163 for 1913–14. Reserve, £10,000; carried forward, £8,299.

Dividends.—1913–14, 60 centimes; 1914–15, 1 franc.

Chairman: Baron René de Batz. Secretary: R. Leo, 7 Rue des Italiens, Paris. London office: Finsbury Pavement House, London, E. C.

HUANCHACA CO. OF BOLIVIA (COMPAÑÍA HUANCHACA DE BOLIVIA).

This large company was incorporated in Bolivia in 1873 to operate silver mines. These mines comprise 3,300 acres situated in Pulacayo, Potosi district, Bolivia. Silver, zinc, lead, gold, copper, and antimony are mined. A railway, about 43 kilometers (27 miles) in length, connects the mine with the main line of the Antofagasta (Chile) & Bolivia Railway.

Capitalization.—12,800,000 bolivianos (40,000,000 francs); par 125 francs. Listed on the Paris Bourse.

Dividends.—5 francs per annum, paid in 1907 and in 1908; none since. Large dividends were paid in earlier years. Debit balance, January, 1915, 173,025 bolivianos. Reserve fund, 1,000,000 bolivianos.

President: A. Alessandri. Secretary: R. Deves. Office: Calle Prat 141, Valparaiso, Chile; Paris Office, 87 Rue St. Lazare.

NATIONAL MATCH FACTORY OF BOLIVIA (LTD.).

Registered in 1907 to acquire a concession from the Government of Bolivia for the exclusive right to manufacture and sell matches in that Republic. The concession will expire in 1930. Under the contract the Government will take 50 per cent of the profits—after debenture service. The factory, which is located at La Paz, is equipped with all modern machinery, and is sufficient in capacity to manufacture more than 130,000 gross of boxes per annum.

Capitalization.—December 31, 1915 (latest obtainable data): Preference shares, 6 per cent, cumulative (par £1), £30,000; ordinary shares (par £1), £50,000; debenture stock (first), 6 per cent (to be retired by 1928), £72,175; total, £152,175.

Income account.—Year ended December 31, 1914: Profits for the year, £36,602; expenses (including £4,330 debenture interest, and £4,800 paid to the Bolivian Government), £508. No dividends are being paid. Debit balance to profit and loss as of December 31, 1914, £4,841.

Directors.—Geo. W. Paton, chairman; O. H. Fuerth, Albert Pam, H. E. Col. Don. Pedro Suarez, Francis M. Voules; secretary, A. R. Bennett, 65 Bishopsgate, London, E. C.

PORCO TIN MINES (LTD.).

Registered 1912. Acquired from the Potosi-Porco (Bolivia) Syndicate (Ltd.) the Porco Tin Mines, area about 400 acres, situated on the Antofogasta & Bolivia Railway (25 miles from Potosi, Bolivia). The mine, now operated for tin, was formerly worked for silver. Ore is conveyed to the mill (capacity 80 tons a day) by means of a 2½-mile aerial ropeway. Estimated ore reserve, 250,000 tons. Valuable water rights are owned.

Capitalization.—£140,000 shares authorized (par £1); £120,075 outstanding, also £19,900 6 per cent convertible debentures. Creditors December 31, 1914, £22,087.

Income accounts.—Not obtainable.

Directors.—E. Hooper, chairman; J. Edwards, L. A. Kensington, J. MacAndrew; secretary, H. F. Ings, 148½ Fenchurch Street, London, E. C. General manager, H. A. Lewis.

TIN PRODUCTION OF BOLIVIA IN 1915.

According to published statistics the tin production of the world in 1915 was 121,800 tons, derived from the following sources: Straits, 54.59 per cent; Bolivia, 29.97 per cent; Banka, Billiton, etc., 15.44 per cent.

The following table (taken from the West Coast Leader) shows in detail the mining companies of Bolivia which contributed to this production in 1915, with the respective quantities in kilos and the value thereof:

Companies.	Kilos.	Value.
DEPARTMENT OF POTOSI.		
		Bolivianos.
Uncia	8,415,894	10,351,550
Llallagua	5,811,944	7,148,691
Velarde	2,376,163	2,922,681
Cia. Oploca	1,965,762	2,417,887
Rescate	1,651,301	2,031,100
de Rescate	1,109,058	1,350,547
Cerro-Rico	1,077,805	1,325,700
Chocaya	725,553	892,430
Chorolque	605,188	744,381
Sala Sala	484,287	595,673
Molino	484,178	595,539
San Joaquin	243,204	299,141
Colquechaca	242,949	298,287
Cotani	167,007	205,419
Ocuri	131,884	163,447
Agua de Castilla	91,938	113,084
Sagrario	87,764	107,950
Andacava	55,167	67,855
Guari-Guari	50,886	62,590
Tazna	32,095	48,117
Hagao	22,295	27,423
Carguaycollo	21,959	27,010
Concordia	21,350	26,260
Choraya	20,156	24,782
Buen Retiro	20,047	24,658
San Vicente	19,619	24,131
San Antonio	18,775	23,093
Pulacayo	9,850	12,015
Consolidada	9,220	11,341
Maragua	8,590	10,566
Candelaria	6,450	7,933
Alianza	5,344	6,573
Esmoraca	1,662	2,044
ORURO.		
Huanuni	1,696,659	2,086,891
Morococala	1,439,771	1,770,918
de Rescate	1,138,184	1,402,632
Socavon	727,660	895,022
Avivaya	602,016	762,620
ORURO—continued.		
		Bolivianos.
Totoral	513,454	631,548
Co. Mra. Oruro	428,679	527,275
San Jose	341,816	420,434
Pazna	288,729	355,137
Negro Pabellon	173,578	213,501
Itos	122,220	150,331
Antequera	84,556	104,004
Challapata	31,577	38,840
Challa-apacheta	29,214	35,933
Vinto	24,160	32,117
Sepulturas	16,534	20,337
San Cristo	7,630	9,385
Eucaliptus	4,460	5,486
Japo	3,050	3,751
LA PAZ.		
Viloca	622,283	765,408
Araca	528,625	650,209
Milluni	317,362	390,355
Tres Cruces	292,576	359,868
Berenguela	243,291	299,248
Chocnacota	283,755	275,219
Concordia	114,322	140,616
Solano	97,754	120,237
Quime	58,432	71,871
Colcha	57,431	70,640
Colquiri	52,088	64,068
Tuesuhuma	45,194	55,589
Bajaderia	38,974	47,938
Andes Tin Co	28,509	35,067
Santiago	20,615	25,356
Yaco	18,807	23,133
Kami	13,861	17,049
Ocavi	10,659	13,111
Jatuncaka	9,200	11,316
Villaque	5,119	6,296
de Rescate	3,056	3,765
Achachicala	2,034	2,502
Total	36,533,238	44,884,911

BRAZIL.

ALAGOAS & NORTHERN RAILWAY.

Registered October 30, 1912, to construct about 90 miles of railway, extending from Bom Jardim, State of Alagoas, Brazil, to Jacuhype, with a branch to Leopoldina. The concession carries a guaranty of 5 per cent on a capital of 45 contos per kilometer. This guaranty is granted by the State of Alagoas, which has the right to purchase the property after 20 years under certain conditions.

Capitalization.—£250,000 shares (par £10), all owned by the Great Western of Brazil Railway (which see). Advances due the latter company December 31, 1915, £126,969.

The line has been surveyed, partly graded, and about 3 miles completed. Work has now been practically abandoned.

AMAZON TELEGRAPH CO.

This company operates about 2,500 miles of cables on the Amazon River, extending from Para to Manaos, with branches on the Para River, Tocantius River, etc. Two twin-screw cable ships are owned. The company in its earlier days had great difficulty in maintaining the service owing to snags, rocks, cave-ins, etc. These difficulties have been largely overcome in recent years.

Capitalization.—£250,000 stock (par £10) and £272,900 5 per cent debentures. Dividends on the stock are payable annually in November (4½ per cent in 1912 and 1913, 3 per cent in 1914, none since); debentures January and July. Listed on the London Stock Exchange.

Income account.—Year ended June 30, 1915: Traffic receipts, £39,177; Government subsidy, £19,125; total, including other income, £57,933; expenses, £34,939; debenture interest and sinking fund, £22,888; surplus, £66; balance from preceding year, £5,841; balance carried forward, £5,947. Reserves June 30, 1915, £54,500. Financial condition good.

Directors.—George Keith, chairman; E. B. Ellice-Clark, Charles W. Parish, Maj. Eustace C. Quilter; secretary, M. S. Munns. Office: 42 Old Broad Street, London, E. C., and Para, Brazil. Manager: F. E. Nosworthy, Para, Brazil.

BRAZILIAN EXTRACT OF MEAT AND HIDE FACTORY.

Registered 1887. Owns the Paredao factory near Porto Alegre, Brazil; also other concessions. The number of cattle killed by the company in 1915 was 3,196, as compared with 3,631 in 1914 and 3,072 in 1913. Extract of beef is manufactured.

Capitalization.—January 1, 1916: Ordinary shares (par £1), £21,109; debentures, authorized £50,000 (6 per cent), outstanding £8,000, (exclusive of £15,000 issued as security against floating loan).

Income account.—Year ended December 31, 1915: Loss on trading in Brazil, £55; total loss for year, £1,312 (loss for 1914, £848; profit for 1913, £1,958).

Goods and products on hand, December 31, 1915, £10,981; cash, £765; sundry debtors, £1,868; sundry creditors and credit balances, £11,439; reserve funds, £8,842.

Directors.—John Beckwith, John Mackenzie, Joseph Edward Roura; secretary, S. L. Clarke. Office: 3 Great Winchester Street, London, E. C.

BRAZILIAN STREET RAILWAY CO. (LTD.).

Incorporated 1868 and reorganized 1899. Owns a tramway 16 miles in length connecting Recife (Pernambuco) with Caxanga, Brazil ("Trilhos Urbanos do Recife a Caxanga").

Capitalization.—Authorized £120,000 in shares of £1 par, outstanding £32,537 5 per cent cumulative preference shares and £86,900 ordinary shares; also £45,950 5 per cent debenture stock, redeemable at 105 per cent, interest April and October.

In 1914 this company's security holders were offered the opportunity of exchanging their debentures and shares for securities of the Pernambuco Tramways & Power Co. (which see).

Office: 134 Palmerston House, Bishopsgate, London, General manager: H. Fletcher, Pernambuco, Brazil.

BRAZILIAN WARRANT CO.

Registered 1911 to take over a company with a similar name. The company's business embraces the following: (1) Providing banking facilities for the coffee trade and for merchants of Santos, São Paulo, etc.; (2) warehousing and handling coffee and other agricultural produce; (3) acting as a clearing house; (4) handling coffee for export; (5) interested largely in an extensive cartage business in Santos, etc.

The principal subsidiaries are the São Paulo General Warehouse Co., owning the largest warehouses in South America, the Companhia Registrado de Santos, the Atlas Coffee Co., the Pure Coffee Co., the Santos Cartage Co., etc. A small guaranty is received annually from the State of São Paulo.

CAPITALIZATION, DECEMBER 31, 1915

Securities	Authorized.	Outstanding.
Ordinary shares	£750,000	£612,500
7 per cent cumulative preference (par £1)	250,000	248,650
Total	1,000,000	861,150

Dividends.—Full preference dividends of 7 per cent per annum have been maintained since the creation of the issue in 1914. Ordinary dividends have been as follows: 1912 and 1913, 7½ per cent; 1914, 5 per cent; 1915, 2½ per cent (1¼ per cent October, 1915, and 1¼ per cent April, 1916).

INCOME ACCOUNTS (CALENDAR YEARS).

Items.	1913	1914	1915
Profits, interest received, rents received, etc	£100,583	£115,318	£94,635
London expenses, income tax, etc	5,183	[a] 22,273	[b] 15,672
Surplus	95,400	93,045	78,964
Balance forward after dividends, reserves, etc	53,475	59,018	40,503

[a] Includes £11,901 expenses, issue of preference shares.
[b] Includes £10,000 income-tax reserve.

From the surplus of 1915 £50,000 was appropriated to the reserve funds, which amounted, as of December 31, 1915, to £160,000. Among assets were £379,044 investments, £25,000 Treasury bills, £589,709 sundry debtors and debit balances, £212,480 stocks and stores, £82,333 cash, and other assets £55,529. Liabilities included £64,577 bills payable and £249,500 sundry creditors and credit balances.

Directors.—Charles E. Johnson, chairman; Edward Greene, managing director; Frederic N. Chapple, Joseph Danon, Julius Deussen, Thomas Fraser, Thomas Thornton; secretary, A. Macdonald, 38 Great St. Helen's, London, E. C. Manager: Charles R. Murray, 44 Rua São Antonio, Santos, Brazil.

CASCALHO SYNDICATE (LTD.).

Registered 1914. Owns three alluvial gold concessions about 4 miles in length (area 6,180 acres) on the Macuhubas River, Diamantina district, State of Minas Geraes, Brazil. It is intended to float subsidiary companies, each to develop certain sections of the property.

Capitalization.—£90,000, consisting of £35,000 "A" shares and £55,000 "B" shares, par £10. This capital is to be increased to £375,000 "A" shares and £110,000 "B" shares. The "A" shares are entitled to 100 per cent dividends in priority to the "B" shares. After "B" shares receive 100 per cent both issues share pro rata. The properties are now in the process of development. No dividends.

Directors.—E. Cattanacle, chairman; W. G. Duncan, W. R. Gaff; secretary, E. A. Foster, 6 Great St. Helen's, London, E. C. Agents in Brazil: P. S. Nicolson & Co., Rio de Janeiro.

CITY OF SANTOS IMPROVEMENT CO. (LTD.).

Incorporated 1880. Supplies water, gas, and electricity to Santos, Brazil, and operates the tramway lines in that city (population 40,000). The government may purchase the water system at a fair valuation. The company at present has exclusive franchises which will expire at various dates beginning 1920. After expiration of exclusive franchises the company will retain plants and property and all privileges except exclusive right to operate. The total mileage of traction lines is 38. Lines cover the city and extend to Barra Beach, São Vicente, and other suburbs, serving a total population of about 150,000. A total of 14,870,776 passengers were carried during 1915, as compared with 15,346,362 in 1914.

Capitalization.—December 31, 1915: £800,000 ordinary stock, £200,000 6 per cent cumulative preference stock, par value of both issues £19; 5 per cent first charge debentures (redeemable), authorized £200,000, outstanding £132,200 (par £100), interest payable January and July; 5 per cent tramway debentures, £200,000 authorized, £179,100 outstanding (these debentures are redeemable; £4,200 redeemed during 1915).

Dividends.—Full dividends have been paid on preference shares for a number of years. The ordinary stock received 7 per cent annually from 1909 to 1913; 3 per cent in 1915.

INCOME ACCOUNTS.

Items	1913	1914	1915
Revenue in Santos, etc	£108,352	£101,130	£83,439
Net revenue	95,557	82,239	71,759
Debenture interest and sinking fund	....	26,141	25,870
Balance for dividends	....	56,098	45,889

Balance sheet.—December 31, 1915: Current assets, stores, cash, etc., £211,885; current and accrued liabilities, £76,372; renewal account (tramways), £26,000; reserve, £67,000; balance to credit, £40,517.

Directors.—D. M. Fox, chairman; F. Henderson, M. U. Workston, H. K. Heyland; secretary, E. H. Sulman, London. London address, Gresham House, E. C.

CITY OF SÃO PAULO IMPROVEMENTS & FREEHOLD LAND CO. (LTD.).

Registered 1911. Acquired approximately 15,000,000 square yards of freehold land in the western section of the city of São Paulo, Brazil, for the purpose of subdividing into plots to be sold, leased, or rented.

Capitalization.—£2,000,000 shares fully paid (par £10); £2,000,000 6 per cent first mortgage gold bonds (par £20 and £100), interest March and September. A sinking fund (beginning 1916) draws bonds at 105. The bonds are redeemable at 105 on six months' notice. They are secured by a first mortgage on lands owned and a proportionate amount of the proceeds of land sales is to be used for redemption purposes. During the 15 months to December 31, 1912, and during 1913 funds were advanced to meet interest requirements, the vendors receiving in payment for funds advanced £252,630 6 per cent second mortgage bonds, due 1932. The September, 1914, coupons on the two bond issues were not paid nor have any subsequent payments been made.

Income account.—None published since 1913; in that year there was a deficit of £146,631.

Directors.—Lord Balfour, of Burleigh, K. T., chairman; J. Brown, vice chairman; C. Braga, H. E. Cradock, G. de Cergat, H. Guedalla, A. D. Gurd, R. de Livio, R. Peto, Dr. H. B. Sabino, Lt. Col. Sir H. B. Smith, L. R. Vigero; secretary, H. E. Carter, 2 Broad Street Place, London, E. C.

COMPANHIA FORÇA E LUZ.

This company was incorporated in 1905 to furnish light and power to the following cities located in the State of Minas Geraes, Brazil: Mirahy, Porto San Antonio, Cataguazes, Leopoldina, São João Nepomuenco, Rio Novo; also to other towns and districts. Power plant located at Leopoldina, the current being generated from a waterfall of about 18,000 horsepower.

Capitalization.—1,000,000 milreis bonds and 300,000 milreis 8 per cent debentures; 2 per cent cumulative sinking fund retires bonds at par.

President, Dr. J. M. Ribeiro Junqueira; secretary, Antonio H. Felipe; treasurer, Dr. Norberto C. Ferreira; manager, Dr. Gabriel M. R. Junqueira; directors, the above. Office: Cataguazes, Minas Geraes, Brazil.

COMPANHIA INDUSTRIAL, OF RIO GRANDE.

Incorporated 1913. Manufactures cotton goods, soaps, vegetable oils, etc. Company owns valuable cotton plantations and also has a concession to construct 125 miles of railway in the State of Rio Grande do Norte.

Capitalization.—3,500,000 milreis.

Officers.—President, Thomas A. A. Saraiva; secretary, Robert Sauce; treasurer, Francisco Solon. Office: Natal, Brazil.

CRÉDIT FONCIER DU BRÉSIL.

This company, incorporated in Paris 1907, advances loans, does a general brokerage business, etc. The capital consists of 12,500,000 francs of stock (par 500 francs), and 37,500,000 francs first mortgage 5 per cent 50-year bonds, Series A. The authorized bond issue is 250,000,000 francs (par 500 francs). The company's affairs in France are administered by a council, the president of which is Achille Adam, Paris, and the vice president Baron Amede Reille. In Brazil Dr. João Teixeira Soares is president of the local council. Office: Avenida Rio Branco 44, Rio de Janeiro, Brazil.

CONQUISTA-XICAO GOLD MINES (LTD.).

A French company, registered 1907. Owns about 46,000 acres of gold-mining lands in the Sapucahy Valley, Minas Geraes, Brazil; also dredging rights and other properties, including hydroelectric works on the Palmella River. These hydroelectric works, in addition to supplying power for the mines, furnish light and power to the towns of São Goncalo and Campanha. A narrow-gauge railway is also owned.

Capitalization.—£100,000 preference and £270,000 ordinary (par £1). The preference shares are entitled to 6 per cent per annum cumulative fixed and 70 per cent of balance. No dividends.

Directors.—E. Claude, president; A. Lazard, E. Lautier, Col. M. A. de Lemos, V. V. G. Wilhelm, E. Sordet; secretary, R. B. McNelly. Offices: 1 Broad Street Place, London; 48 Avenida Rio Branco, Rio de Janeiro, Brazil; 54 Rue Blanche, Paris. Manager, D. Proust, Campanha, Brazil.

JARDIM BOTANICO TRAMWAY CO.

Registered 1882. Operates about 50 miles of tramway lines in the Jardim Botanico section of Rio de Janeiro, the concession expiring in 1960. Controlled by the Rio de Janeiro Tramway, Light & Power Co. (which see), through ownership of a majority of shares. The latter company has assumed the operation of the property, taking all gross earnings and paying all operating expenses, as well as interest on the Jardim Botanico Tramway Co.'s bonds and 7 per cent dividend on the shares.

Capitalization.—(1) 21,000,000 milreis shares, par value 200 milreis, of which 14,000,000 milreis are fully paid and 7,000,000 milreis 60 per cent paid; (2) first-mortgage 5 per cent bonds dated 1911, repayable on or before July 1, 1951, by means of a sinking fund which purchases bonds up to 102½ or draws them at that figure (£1,400,000 bonds are authorized and all have been issued). Interest payable January and July at Canadian Bank of Commerce, Toronto and New York.

Income account.—Not published.

Offices: Toronto, Canada; Rio de Janeiro, Brazil; and 34 Bishopsgate, London, E. C.

LEOPOLDINA TERMINAL CO. (LTD.).

This company was registered 1911 and had acquired to December 31, 1915, 45,599 of a total of 50,000 shares (par 200 milreis) in the Companhia Cantareira e Viação Fluminense, which has a concession to operate approximately 45 miles of tramway lines in the city of Nictheroy (opposite Rio de Janeiro), Brazil. The population of the city is about 40,000. The company also operates a line of ferries between Rio and Nictheroy and a warehouse in the city of Rio. The company is controlled by the Leopoldina Railway.

Capitalization.—December 31, 1915: Ordinary shares, £1,250,000 (par £1), of which £625,001 are owned by the Leopoldina Railway (which see); first debentures (par £100), £1,237,000. A sinking fund of one-half of 1 per cent per annum is in operation. Interest is payable January and July 1. The proceeds of this debenture issue were used to acquire securities and to liquidate current accounts.

INCOME ACCOUNTS, CANTAREIRA CO. (CALENDAR YEARS).

Items.	1912	1913	1914	1915
MARITIME SECTION.				
Gross receipts	£150,391	£162,350	£130,723	£103,404
Working expenses	70,254	70,379	59,211	55,117
Maintenance	20,672	29,105	22,006	18,945
Net receipts	59,465	62,866	49,506	20,342
TRAMWAYS SECTION.				
Gross receipts	127,402	140,414	113,810	103,404
Working expenses	50,072	52,070	43,652	33,087
Maintenance	28,239	32,149	28,653	22,006
Net receipts	49,091	56,195	41,505	48,311
WAREHOUSES AND PIERS.				
Gross receipts	19,496	16,024	16,090	15,168
Working expenses, including maintenance	7,258	6,463	4,648	3,726
Net receipts	12,238	9,561	11,442	11,442
WATER SERVICE.				
Gross receipts	26,352	[a] 13,290	....	....
Expenses	13,415	[a] 5,214	....	....
Net receipts	12,937	[a] 8,076	....	....

[a] Figures are for six months only; the concession for the water service was disposed of during the year 1913 to the government of the State of Rio de Janeiro for £253,480, which sum was transferred to the Terminal Co. and used to reduce outstanding advances.

NOTE.—Administration and general expenses of the Cantareira Co.: 1912, £19,877; 1913, £22,354; 1914, £17,376; 1915, £14,992.

REVENUE ACCOUNT OF TERMINAL CO.

Items.	1913	1914	1915
Net revenues for year	£85,770	£69,703	£66,905
Add balance from previous year	3,599	4,994	5,947
	89,369	74,697	72,852
Deduct interest and sinking funds	68,750	68,750	69,114
Balance (surplus)	20,619	5,947	3,738
Dividend	[a] 15,625	None.	None.

[a] 1¼ per cent.

Cash on hand or on deposit at interest, December 31, 1915, £68,622; bills receivable, £13,751; 5 per cent debentures of company owned, £78,461; sundry creditors, £7,888.

Directors.—Oliver R. H. Bury, chairman; R. E. Brounger, N. B. Dickson, Col. Sir Henry E. McCallum, J. H. Wicks; secretary, J. H. Drury, 3 Lombard St., London, E. C.

MANAOS TRAMWAYS & LIGHT CO. (LTD.)

Registered January, 1909. Acquired from the State of Amazonas, Brazil, a concession for the lighting and tramway systems of the city of Manaos (on the Amazon River; population, 60,000). Property reverts to the State in 1968 without payment. The company is exempt from customs duties on supplies, etc., and the consideration payable under the concession is £12,500 per annum for the first five years, thereafter increasing £1,250 per annum for each five-year period.

Capitalization.—April 30, 1915: Shares (par £1), £300,000; 5 per cent first (mortgage) debentures, £293,900; subsequently £50,000 debentures were issued as collateral for a loan. The expense of the debenture issue (including £49,500 discount) was £53,000. Reserves as of April 30, 1915, £50,725; loan outstanding, £28,000.

INCOME ACCOUNTS.

Items.	Year ended April 30—		
	1913	1914	1915
Gross receipts	£152,106	£132,877	£110,420
Operating expenses	101,943	96,848	84,240
Net receipts	50,163	36,029	26,180
Net income	50,163	36,041	26,189
Charges	18,510	21,615	[a]26,0 8
Surplus	22,107	14,426	141

[a] Includes £6,180 loss on exchange.

Of the gross receipts for 1914–15, £68,992 was from tramways and £40,338 from lighting. It was stated as of April 30, 1915, that the State and Federal and municipal governments were somewhat in arrears for street lighting, etc.

Directors.—George M. Booth, chairman; W. Harold Tregonning, William C. Burton, James Mitchell, George Watson; secretary, H. W. Stacey, 9 Cloak Lane, London, E. C. Operating managers, J. G. White & Co. (Ltd.) (same address). Manager at Manaos: E. B. Kirk.

MAPPIN & WEBB (BRAZIL) (LTD.).

Registered 1911. Took over the Brazilian business of Mappin & Webb (Ltd.) in jewelry, gold, silverware, cutlery, etc. An extensive business is carried on.

Capitalization.—Preference shares, £100,000 (cumulative, 6 per cent); ordinary shares, £15,000. The dividend on the preference shares is guaranteed until 1918 by Mappin & Webb (Ltd.). Preference shareholders may vote only under special circumstances.

Income accounts.—Not made public except to shareholders.

Directors.—W. J. Mappin, chairman; W. D. Barlow, W. T. Haddock, H. J. Mappin, S. A. Mappin, H. Portlock; secretary, J. T. Boyes. Office (London): 158–162 Oxford Street.

MOINHO SANTA CRUZ.

Does an extensive grain-milling and warehouse business; sells a large amount of flour annually.

Capitalization.—3,000,000 milreis; par value of shares, 200 milreis.

OURO PRETO GOLD MINES OF BRAZIL (LTD.).

Incorporated 1884 to develop mining properties in Brazil; reconstructed 1893 and again in 1914. Mines, which have been extensively developed, are located in the State of Minas Geraes. The Passagem Mining Estate (2½ square miles) and the Santa Anna Mines (1 square mile) are the principal properties.

PARA ELECTRIC LIGHTING & RAILWAY CO. (LTD.).

This company was incorporated in 1905 to acquire the street railway and electric lighting undertaking of the Companhia de Estrada de Ferro Paraense, of Para, Brazil. Concession expires December, 2004. In 1915 the company purchased at a cost of £6,389 the entire stock of the Para Gas Co. The terms of purchase entailed the guaranty of the 5 per cent interest and 1 per cent amortization per annum on the £24,900 outstanding debentures. The £6,389 paid for the £49,000 shares of the Gas Co. was distributed £5,000 in preference shares and the balance in cash. The length of the tramway lines is 34½ miles.

CAPITALIZATION, NOV. 30, 1915.

Securities.	Authorized.	Outstanding.
6 per cent preference shares, cumulative (par £5)	£390,000	£325,000
Ordinary shares (par £5)	390,000	390,000
5 per cent first debenture stock [a]	700,000	668,399
Total	1,480,000	1,383,399

[a] The first debenture stock is amortized by means of a sinking fund of one half per cent per annum, which purchases the debenture stock up to 105 or draws same at that price.

INCOME ACCOUNTS.

Items.	Year ended November 30—	
	1914	1915
Operating profits, etc	£118,177	£128,821
Interest, loss on exchange, etc	49,753	75,916
Balance	68,424	52,905
Balance from previous year	19,206	20,030
Balance available for dividend	87,630	72,935
Reserve appropriations	25,000	15,000

Note.—Gross receipts for 1914-15 were £243,483, as compared with £249,892 in 1913-14 and £302,103 in 1912-13.

DIVIDENDS.

	1907-8 and 1908-9	1909-10 to 1912-13	1913-14	1914-15
	Per cent.	*Per cent.*	*Per cent.*	*Per cent.*
Preference	6	6	6	6
Ordinary	0	10	6	5

OPERATING DATA.

Items.	1913	1914	1915
Passengers carried	23,254,258	19,339,989	18,382,979
Car miles run	3,172,069	2,974,422	2,773,800
Consumers connected	3,890	3,951	4,099
Units sold for light and power	2,371,997	2,430,834	2,418,804

Stores on hand November 30, 1915, £71,306; sundry debit balances, £42,316; British Government Treasury bills, £19,913; cash, £39,313; bank bills receivable, £38,500; sundry credit balances, £20,874; unclaimed dividends, £34,838.

Directors.—Great Britain: Follett Holt, chairman; Dr. Jose Paes de Carvalho (formerly president of the State of Para), F. M. Voules, Herbert Ansell, E. S. Baring-Gould, W. C. Burton, E. C. Chester, W. K. Whigham. At Para, Brazil: Dr. Augusto Octaviano Pinto, Dr. Lucio Amorim Do Amaral. Secretary, E. A. Borel, 9 Cloak Lane, London, E. C. Manager in Para, W. Binns. Operating managers, J. G. White & Co. (Ltd.).

PARA (MARAJO) ISLANDS RUBBER ESTATES.

Registered 1910 to acquire rubber properties covering an area of more than 150,000 acres, situated on the island of Marajo, municipality of Anajas, State of Para, Brazil. It is stated that rubber trees exist on the property in very large numbers. Owing to the decline in the price of the commodity a receiver was appointed (February, 1915) on behalf of the debenture holders.

Capitalization.—£20,000 preference shares, 6 per cent cumulative (par 1s.); £100,000 ordinary shares (par 5s.); debentures, £7,380. Interest due January 1, 1915, was defaulted on this debenture issue. No statements are available later than 1912, when a profit of £1,502 was realized.

Directors.—B. S. Straus, chairman; E. A. Greathed, the Right Hon. Sir W. Ridgeway; receiver, John Skinner; secretary, E. F. Johnson. Office: 6 Broad Street Place, London, E. C.

PARA PUBLIC WORKS CO. (LTD.).

This company has the exclusive right to construct, equip, and work the public service of telephones in the city of Para (Belem), Brazil. As of December 31, 1915, 762 telephones were in use, as compared with 676 on December 31, 1914, and 620 on December 31, 1913. The present installation has a capacity of 1,620 telephones. Formerly the company had a contract for the public cleaning of the city; this was canceled for a consideration of £275,200 of municipal bonds, which have been disposed of by the company and the proceeds largely used to retire outstanding 7 per cent bonds.

Capitalization.—December 31, 1915: Ordinary shares (par £1), £60,000; deferred shares, £2,000. After dividends have been paid on the ordinary shares up to 100 per cent the deferred shares will be entitled to dividends up to £2,000; in the event of liquidation both issues share ratably.

INCOME ACCOUNTS (CALENDAR YEARS).

Items.	1913	1914	1915
Telephone subscriptions	£8,872	£10,753	£11,940
Expenses Para and London	6,867	7,247	8,029
Balance carried down	2,005	3,506	[a] 3,911
Balance from previous account	1,286	3,291	6,797
Total surplus	3,291	6,797	10,708

[a] After allowing £1,080 loss on exchange.

The £10,708 surplus as of December 31, 1915, was appropriated £1,500 depreciation on investments and £5,000 depreciation on installation; the balance, £4,208, being carried to balance sheet. Of this balance, £2,100 (2½ per cent) was paid as a dividend.

Directors.—Francis M. Voules, chairman; H. E. Col. Don Pedro Suarez, T. M. C. Steuart; secretary, A. R. Bennett, 65 Bishopgate, London, E. C.

PORT OF BAHIA.

Incorporated 1902 to construct docks and port works at Bahia, Brazil. Property may be acquired by the Federal Government after December, 1922, under certain conditions.

Capitalization.—50,000,000 milreis shares; £3,000,000 5 per cent bonds (denominations £20 and £100), redeemable at par by December 31, 1972, by means of a sinking fund commencing 1923. These bonds were mostly disposed of in France. A total of 70 per cent of the net revenues of the port are to be applied to the bond interest and sinking fund. In the event of this sum proving insufficient the Federal Government has undertaken to impose a special ad valorem customs tax of 2 per cent gold upon all merchandise imported via this port. Should this sum prove insufficient it is to be increased until the necessary amount shall be raised. Interest was defaulted on the bonds September, 1914.

Income account.—1914: Net revenues, £143,949.

Offices: Bahia, Brazil, and Paris, France.

RIO DE JANEIRO BENEDICTINE ORDER LOAN.

These bonds, offered in London in 1909, bear interest at 5 per cent and are to be retired July 1, 1950, by means of a sinking fund, which began operations in 1915 and which will purchase bonds up to par or will draw them at that figure. Bonds are redeemable at the option of the Order at 103 per cent on six months' notice. The loan is for the total sum of £300,000.

The bonds are the obligation of the monastery of São Bento, Rio de Janeiro, and are secured by lands on which are business and residential places. The value of the property is estimated at £600,000. The revenues from it during 1913 totaled £42,815.

ST. JOHN DEL REY MINING CO. (LTD.).

This company was chartered in 1830 to acquire gold-mining properties in Brazil. The company has operated the Morro Velho Mine continuously for about 85 years. A cave-in that occurred during 1886 necessitated a reconstruction of the property during 1887–88. A shaft has been driven for a depth of more than a mile.

CAPITALIZATION, FEBRUARY 29, 1916.

Securities.	Authorized.	Out-standing.
10 per cent preference shares (par £1)	£100,000	£100,000
10 per cent second preference shares (par £1)	100,000	....
Ordinary shares (par £1)	600,000	546,265
7 per cent debentures	....	[a] 13,370

[a] Of this total £11,570 was redeemed prior to June 1, 1916.

INCOME ACCOUNTS.

Items.	1914-15[a]	1915-16[a]
Bullion and silver produced, rents, etc	£439,568	£450,934
Working expenses	291,713	286,214
Balance carried to profit and loss account	147,855	164,720
Net, including balance brought forward, etc	157,331	176,101
Balance after London expenses, income tax, etc	137,344	133,951
Amounts transferred to reserve, capital works account, etc	60,000	60,000
Preference dividend, and tax	10,813	11,750
Ordinary share dividend	[b] 54,626	[b] 54,626
Production of gold and silver ... tons	199,234	201,552
Total tonnage (2,240 pounds) crushed	191,500	192,500

[a] Years ended Feb. 28 and 29.

[b] 10 per cent.

Sundry debtors, February 29, 1916, £24,083; cash, £71,703; gold and silver in Brazil and in transit, £50,847; British Treasury bills (£40,000 since redeemed), £87,643; investments, at minimum prices, £115,351.

Directors.—H. Percy Harris, chairman; J. F. Remnant, Sir Edw. Goulding, Col. H. Le Roy-Lewis, C. B., D. S. O.; C. F. W. Kup, managing director; acting secretary, F. V. Steward; superintendent at the mines, George Chalmers, Morro Velho, Brazil. London office: Finsbury House, Bloomfield Street, E. C.

SÃO PAULO GAS CO. (LTD.).

Registered 1869. The company has a concession, expiring 1950, from the State of São Paulo. The company at the expiration of the concession will retain its property and will still have the right to furnish gas and its products.

CAPITALIZATION, DECEMBER 31, 1914.[a]

Securities.	Authorized.	Out-standing.
6 per cent preference shares, cumulative (par £10)	£150,000	£150,000
Ordinary shares (par £5)	350,000	275,000
5 per cent debentures due 1928 (par £50)[b]	125,000	125,000
Total	625,000	550,000

[a] Latest figures obtainable.

[b] The debentures are secured by a first charge on the property and are redeemable at par at the company's option.

INCOME AND PROFIT AND LOSS ACCOUNTS (CALENDAR YEARS).

Items.	1912	1913	1914
Brought forward from previous year	(a)	£48,860	£37,584
Net earnings from operations in Brazil, etc	£76,448	65,069	62,273
Total income	76,448	113,929	99,857
London charges, income tax, interest, etc	16,005	39,569	35,398
Surplus	60,443	74,360	64,459
Preference shares dividends	[b] 9,000	[b] 9,000	[b] 9,000
Ordinary dividends	[c] 13,750	[b] 16,500	[d] 17,875
Transferred to reserve	....	11,276	....

[a] The sum of £11,546 was brought forward from 1911. This sum is not included above.

[b] 6 per cent.

[c] 5 per cent.

[d] 6½ per cent.

After payment of the ordinary-shares dividend in 1914 a total of £37,584 was carried to the balance sheet. The balance sheet as of December 31, 1914, reported coal and stores on hand and in transit, £132,895; sundry debtors, £47,677; investments, £20,736; bills receivable, £12,143; cash, £56,729; loans payable, £139,513; sundry creditors, £29,545; general reserve fund, £125,000.

Directors.—F. H. W. Hope; H. Schulman, chairman; H. Malcolm Hubbard; secretary, G. H. Rogers. Office: 306 Caxton House, London, S. W.

SÃO PAULO RAILWAY CO. (LTD.).

Organized in 1859 to construct a railroad between São Paulo and Santos, Brazil. Has a monopoly of the trade between these two cities. The Government may purchase the line in 1927 under certain conditions. The following data, unless otherwise indicated, show the status of the railway as of June 30, 1915:

Location.—Main line extends 86.5 miles from Santos via São Paulo to Jundiahy, with a branch line to the town of Bragantina, 67 miles; total mileage operated, 153.5. Santos, the greatest coffee port in the world, with a population of 75,000, is the shipping port for the important city of São Paulo (population nearly 500,000, second in size in Brazil). São Paulo is a great commercial and industrial city, with about 500 factories, whose working capital is estimated to be $20,000,000. The population of Jundiahy is about 20,000. The line from Santos to São Paulo and beyond is entirely double tracked.

Equipment.—December 31, 1915: Locomotives, 138; passenger cars, 209; freight cars, 4,028; miscellaneous cars, 122.

Management.—A. J. Owen, superintendent; Vernon Hinde, secretary. Directors: Lord Balfour, of Burleigh, chairman; O. R. H. Bury, F. N. Chapple, John Gordon, Charles E. Johnston, Sir Gerard Smith. Semiannual meeting: Last Wednesday in April and October. General office: 111 Gresham House, Old Broad Street, London, England. Operating office: São Paulo, Brazil.

Tonnage.—For the calendar year 1915, 2,526,726 tons of freight were transported, as compared with 2,414,536 tons for 1915 and 3,239,909 for 1913. Coffee is the principal product carried, and practically the entire product of Brazil is shipped over this road.

Income account.—For the half year ended December 31, 1915, the gross receipts from all traffic sources were £1,016,732; operating expenses, £597,495; net receipts, £419,237; other income, £25,807; total net income, £445,045; interest, etc., £56,530; surplus, £388,515; balance forward from preceding half year, £171,276; surplus available for dividends, etc., £559,792; preference dividend for half year, £25,000; ordinary dividend, £150,000; income tax, £100,000; carried forward, £284,791.

Train-mile earnings are the greatest in South America, and are generally in excess of the total reported by any steam railway in North America.

Balance sheet.—The balance sheet as of June 30, 1915, showed cash, stores, bills receivable, and other current assets (including investments with a market value of £888,299), to a total of £2,518,844, as against current liabilities of £335,261. There was a reserve fund of £2,131,730, and an income-tax reserve of £79,607.

In the income account for June 30, 1915, other deductions after fixed charges were for depreciation in value of investments during the year since July 1, 1914.

Bonded debt.—£1,000,000 5½ per cent debenture stock; £250,000 5 per cent debenture stock; £1,000,000 4 per cent debenture stock.

Capital stock.—£1,000,000 5 per cent preference stock and £3,000,000 ordinary stock.

Dividends.—1901 to 1906, 12 per cent; 1907 to 1911, 13 per cent; 1912 and 1913, 14 per cent; 1914 and 1915, 10 per cent (free of income tax).

CHILE.

AMELIA NITRATE CO. (LTD.).

This company, one of the large nitrate producers of Chile, was registered 1896. The shares are owned approximately two-thirds in Great Britain and one-third in Germany. Nitrate, iodine, etc., are produced.

Capitalization.—June 30, 1915 (latest obtainable): Preference shares, 6 per cent cumulative (par £100), £50,000; ordinary shares (par £10), £156,000; 5½ per cent first-mortgage debentures (par £50), £120,000 (these debentures are repayable by sinking fund prior to January 1, 1920, by annual drawings at

103 per cent; approximately £100,000 outstanding August, 1916); 5½ per cent 10-year debentures, £89,300 (original issue £100,000; balance redeemed).

Dividends.—On preference shares: 1906–7, 48 per cent; 1907–8, 27 per cent, liquidating all back dividends; 1908–9 to 1915–16, 6 per cent per annum. Ordinary: 1907–8, 18 per cent; 1908–9, 28 per cent; 1909–10 and 1910–11, 8 per cent; 1911–12 and 1912–13, 9 per cent; 1913–14, 7 per cent; 1914–15, 7 per cent.

INCOME ACCOUNTS.

Items.	1912	1913	1914	1915
Gross profits	£72,460	£66,680	£62,577	£57,796
Balance from previous year	571	618	529	13,210
Total	73,031	67,298	63,106	71,006
Charges, London expenses, income tax, etc	20,623	23,498	24,135	24,854
Total surplus	52,408	43,800	38,971	46,152
Production—quintals	1,332,357	1,220,543	1,124,112	992,968

Of balance for 1915, £31,140 was used for sinking fund, £3,000 for preference dividend, and £10,920 for ordinary dividend; £426 was carried forward.

Balance sheet.—June 30, 1915: Cash, £10,340; bills receivable, £22,618; remittances in transit, £53,571; stocks in hand, £145,827; furniture and fittings, £3,550; sundry creditors, £124,610; reserve account, £37,500.

Directors.—Baron Bruno Schroder, chairman; C. A. Bingel, Sir Walpole Greenwell; secretary, C. A. Huni, F. C. I. S., 3 Finch Lane, London, E. C.

ANGLO-CHILEAN PASTORAL CO. (LTD.).

Registered 1904 to acquire until September, 1923, the right to a large tract of land located within the watershed of the Frias River, Chile. The property is 2,240 square miles in area and extends from the Pacific coast to the boundary with Argentina. Cattle, sheep, horses, and mules are raised. As of November, 1914 (latest report rendered), 28,613 sheep were owned (total wool clip for 1913–14, 112,795 pounds), as well as 8,141 head of cattle and 555 horses and mules. About 90 miles of property have been fenced.

Capitalization.—April 30, 1914 (latest figures obtainable): Shares authorized (par £1) £120,000, outstanding £83,025; debentures, 10 per cent, authorized £20,000, outstanding £7,600 (remainder of authorized issue deposited as collateral for sundry creditors).

INCOME ACCOUNTS.

Items.	Year ended April 30—	
	1913	1914
Sales of wool, live stock, and stores	£8,508	£11,428
Expenses in Chile	3,551	3,903
Net profit in Chile	4,957	7,525

Interest accrued on debentures as of April 30, 1914, £4,148.

Directors.—Frederick William Kerr, chairman; Alex. Henderson, Arnold Wethered; secretary, G. M. O'B. Horsford, F. C. I. S., 31 Budge Row, Cannon Street, London, E. C. Manager: D. H. Brand.

CARRIZAL SHARE TRUST (LTD.).

Registered 1900. Owns £679,900 shares of the Sociedad Minas y Fundiciones de Carrizal (Chile), operating copper mines.

Capitalization.—£110,000 shares authorized (par £1), £67,997 outstanding.

Dividends.—1905–6, 6d.; 1906–7, 8d.; 1907–8, 10d.; none since.

Debit balance.—Year 1915: £270.

Directors.—T. P. P. Powell, chairman; Sir H. W. Kirby, G. R. H. Wilson; secretary, H. J. Page, 21 Ironmonger Lane, London, E. C.

CHILEAN STORES (GATH & CHAVES) (LTD.).

Registered February, 1913, to take over the business of general stores and merchants in Chile, formerly carried on by the South American stores (Gath & Chaves) (Ltd.).

CAPITALIZATION, JULY 31, 1915.

Securities.	Authorized.	Outstanding.
Preference shares (par £1), entitled to 6 per cent per annum cumulative and 25 per cent of the surplus profits	£200,000	£131,000
Ordinary shares (par 10s.), entitled to 6 per cent per annum noncumulative and 75 per cent of the surplus profits	200,000	200,000
Total capitalization	400,000	331,000

INCOME ACCOUNTS.

Items.	Year ended July 31—	
	1914	1915
Net profits in Chile	£14,179	£11,712
Balance (after expenses) carried to balance sheet	11,915	9,846
Preference dividend	[a] 7,860	[a] 7,860
Ordinary dividend	....	[b] 6,000
Transferred to reserves	4,055	....

[a] 6 per cent. [b] 3 per cent.

Stock on hand and in transit July 31, 1915, £268,560; bills receivable, £29,000; cash, £4,814; sundry debtors and debit balances, £7,805; sundry creditors and credit balances, £51,790; reserves, £5,291.

Directors.—Sir W. Capel Slaughter, chairman; Georges Benard, G. L. Bevan, Lorenzo Chaves, Baron F. A. d'Erlanger, B. Nathan. Local board in Santiago de Chile: Adolpho Guerrero, chairman; Salvador Izquierdo, Luis Davila Larrain, Pablo Della Valle. Secretary: George Frampton, 8 Crosby Square, London, E. C.

CHILE TELEPHONE CO.

Registered 1889, to acquire various telephone properties in Chile.

Capitalization.—£330,000 (£360,000 authorized) shares, par £5.

Dividends.—1906–7 to 1909–10, 8 per cent; 1910–11, 7 per cent and 50 per cent in shares; 1911–12, 8 per cent, subject to tax; 1912–13 to 1916–17, 8 per cent each, tax free.

LAGUNAS SYNDICATE (LTD.).

This company was registered in 1889 to acquire nitrate properties in the Province of Tarapaca, Chile.

Capitalization.—June 30, 1917: Shares (par £1), £550,000; debenture bonds, £394,380; outstanding balance of £547,130, 5 per cent, to be retired at par up to 1923, interest payable January and July 15.

Dividends.—1911, 6 per cent; 1911–12, 5 per cent; 1912–13, 4 per cent; none since.

Income account.—Year ended June 30, 1917: Gross profits, £58,138; net profits after charges, £32,623. The latter sum was transferred to sinking fund.

The cost of the works and property, less sinking fund, was £849,698, and the total assets amounted to £1,188,294.

PACIFIC & EUROPEAN TELEGRAPH CO. (LTD.).

Registered 1892. Operates a through telegraph line from Valparaiso to Santiago, Chile, and to Buenos Aires, Argentina; completed 1894.

Capitalization.—£100,000 shares, all held by the Western Telegraph Co. and the West Coast Telegraph Co. These two companies guarantee an issue of £68,400 4 per cent mortgage debentures, due 1942 (original issue, £100,000, callable at 110). Original offering price of debentures, 102 per cent; interest due June and December.

Income account.—Not made public.

Directors.—Sir A. J. W. Cappel, K. C. I. E., chairman; B. J. W. Barry, Hon. A. C. Brodrick, Sir J. Denison-Pender. Office: Electra House, Finsbury Pavement, London, E. C.

PAN DE AZUCAR NITRATE CO. (LTD.).

Registered 1901. Owns Pan de Azucar nitrate properties located in Tarapaca, Chile.

Capitalization.—£110,000 shares, par £5.

Dividends.—1903–4 to 1907–8, 12 per cent yearly; 1908–9, 1909–10, and 1910–11, 6 per cent; 1911–12, 15 per cent; 1912–13, 18 per cent; 1913–14, 8 per cent; 1914–15, none.

Income account.—Year ended June 30, 1915: Loss from operation, London expenses, etc., £15,421. This compares with a usually large profit, and was due to abnormal war conditions.

Directors.—Hon. Herbert C. Gibbs, chairman; Brien Cokayne, Andrew Geddes, H. W. Sillem, J. I. Smail; acting secretary, A. H. Short, 25 Old Broad Street, London, E. C.

PODEROSA MINING CO. (LTD.).

Registered 1908. Acquired a copper property, comprising 455 acres, located in Collahuasi district, Province of Tarapaca, Chile.

Capitalization.—£500,000; par £1.

Dividends.—5s. paid 1909; none since.

Income account.—Year ended December 31, 1915 (rendered July 31, 1916): Net receipts from sales of ore, interest, etc., £60,033; net after mining expenses, £21,588; net surplus after depreciation of buildings, etc., £17,025; balance at debit of the revenue account, £3,278, as compared with £20,304 at close of 1914. Net receipts for 1914 were £42,382; the net operating loss was £5,794.

During 1915, 3,734 tons of copper ore, of an average assay of 21.86 per cent copper and 5.93 ounces silver per ton, were shipped to the smelter—this comparing with 5,289 tons, assaying 18.23 per cent copper and 3.95 ounces silver, in 1914 and 7,793 tons in 1913.

Directors.—Charles Fearn, chairman; William J. Barnett, Vicente Echeverria, Lionel W. Harris; secretary, F. W. Bishop, F. C. I. S. Office: 9 New Broad Street, London. Mine manager: J. H. Ivey, Antofagasta, Chile.

VALPARAISO (CITY) WATER-BOARD 5½ PER CENT BONDS.

This issue, £250,000, was floated in London during 1912 by J. Henry Schroder & Co., of London, at 99 per cent. Bonds are to bearer and in denominations of £100, interest payable April and October. A cumulative sinking fund will redeem the entire issue on October 1, 1940. This sinking fund buys bonds in the open market at below par or draws them at that figure. The proceeds of the issue were used to extend and improve the water supply of the city. The issue is unconditionally guaranteed both as to principal and interest by the Government of Chile and is free from any taxes in that Republic. The waterworks are operated by a board consisting of the provincial administrator of Valparaiso, two citizens, and two members of the municipality, one appointed by the President and the other by the municipality.

While these bonds are not actually the obligation of the city of Valparaiso, they may for convenience be classified as municipal bonds.

This issue is officially quoted on the London Stock Exchange.

WEST COAST OF AMERICA TELEGRAPH CO.

This company is a reorganization (year 1897) of a previous company incorporated 1877 to take over telegraph lines along the west coast of South America. The Western Telegraph Co. owns a large block of the stock.

Capitalization.—£112,520 shares (par £10); £150,000 4 per cent debentures, repayable at par January 1, 1917 (par £100); £20,000 4 per cent noncumulative income debentures. This company, jointly with the Western Telegraph Co., guarantees £100,000 4 per cent debentures of the Pacific & European Telegraph Co.

Dividends.—2½ per cent annually, 1906 to 1912; none since.

INCOME ACCOUNTS.

Items.	1914	1915
Gross receipts	£61,129	£65,476
Working expenses	43,054	46,216
Net receipts	18,075	19,260

Including £1,995 brought forward from December 31, 1914, the total net income was £20,778; interest on debentures (including 4 per cent income bonds), £6,800; transferred to general reserve fund, £5,000; provision on account of investment fluctuations, £6,000; balance, £2,978. Reserve fund investments as of December 31, 1915 (marketable securities), were valued at £78,341, less £16,000 provision on account of investment fluctuations. Current assets and stores, £44,603; current liabilities, £11,619.

Directors.—Sir John Denison-Pender, K. C. M. G., chairman; Sir Albert J. Leppoc Cappel, K. C. I. E., Francis Alexander Johnston; secretary, Frederick L. Robinson. Office: Electra House, Finsbury Pavement, London, E. C.

QUOTATIONS AND DIVIDENDS OF SECURITIES.

The following table, from the official list of the Valparaiso Stock Exchange, shows the quotations and dividend records of Chilean securities, as of April 20, 1917. The sign $ is used to indicate Chilean paper pesos, worth approximately $0.2825 on April 1, 1918.

Companies.	Capital.		Value of share.		Dividends (total).			Market price.
	Nominal.	Paid in.	Nominal.	Paid in.	1916	1917	Last.	
BANKS.					*Per cent.*	*Per cent.*	*Per cent.*	
Chile	$80,000,000	$40,000,000	200	100	12	8	8	206
Hipotecario de Chile	$6,000,000	$6,000,000	200	200	15	10	10	518
Santiago	$3,000,000	$6,000,000	100	100	20	7	7	136
Español de Chile	$10,000,000	$30,000,000	100	100	14	6	6	148
Hipotecario de Valparaiso	$1,000,000	$2,000,000	100	100	12	5	5	115
Nacional	$25,000,000	$16,000,000	100	40	10	....	6	49½
República	$14,000,000	$14,000,000	100	100	....	....	6½	413
Italiano	$10,000,000	$10,000,000	100	100	....	....	4½	
PASTORAL AND LIVE-STOCK COMPANIES.								
Tierra del Fuego	£1,800,000	£1,800,000	1	1	30	10	10	77½
Chile & Argentina	£475,000	£475,000	1	1	....	....	....	7½
Aysen	£100,000	£100,000	1	1	15	....	5	47
Laguna Blanca	£195,000	£195,000	1	1	15	10	10	72
Gente Grande	£85,000	£85,000	1	1	25	5	5	84
NITRATE COMPANIES.								
Antofagasta	$16,000,000	$16,000,000	25	25	80	20	20	148½
La Unión	$3,000,000	$3,000,000	20	20	4	....	2	12
F. C. de Agua Santa	£600,000	£600,000	10	10	7½	2½	½	250
Lastenia	£500,000	£500,000	1	1	$6	....	$2	27
Boquete	£800,000	£800,000	5	5	3	....	3	80
Aurrerá	£125,000	£125,000	1	1	....	....	$2	....
Loa	£650,000	£650,000	1	1	26	5	5	50
Perseverancia	$2,800,000	$2,800,000	20	20	22½	7½	7½	80

Companies.	Capital.		Value of share.		Dividends (total).			Market price.
	Nominal.	Paid in.	Nominal.	Paid in.	1916	1917	Last.	
MINING COMPANIES.					*Per cent.*	*Per cent.*	*Per cent.*	
Gatico	£275,000	£275,000	1	1	$2	$2	$2	48
Curanilahue	$9,000,000	$9,000,000	100	100	9	....	3	115
Antequera	£70,000	£70,000	0.4	0.4	....	....	....	1
Poderosa de Collahuasi	£500,000	£500,000	5	5	$5	....	$5	30
Caylloma	£132,000	£132,000	1	1	....	....	....	8¼
Llallagua (Bolivia)	£425,000	£425,000	1	1	65	25	25	111¾
Taltal	$1,000,000	$1,000,000	10	10	....	....	10	17½
Lota & Coronel	$18,000,000	$18,000,000	100	100	19½	28	28	452
Oruro	$6,000,000	$6,000,000	20	20	12½	10	10	20¼
Oploca	£140,000	£140,000	1	1	45	....	15	70
Colquiri	$2,000,000	$2,000,000	10	10	....	....	....	5½
Las Vacas	$1,500,000	$1,500,000	10	10	....	....	....	9
Schwager	£500,000	£500,000	20	20	30	10	10	1,600
GAS COMPANIES.								
Valparaiso	$4,000,000	$4,060,000	50	50	15	4	4	100
Concepcion	$400,000	$400,000	50	50	4	4	4	50
Santiago	$9,000,000	$9,000,000	50	50	18	9	9	102
INSURANCE COMPANIES.								
La Alemana	$2,000,000	$200,000	500	50	30	....	....	195
America	$2,000,000	$200,000	250	25	20	12	12	55
La Central	$2,000,000	$1,000,000	50	25	13.3	....	....	32
Chilena Consolidada	$2,000,000	$2,000,000	25	25	16	8	8	49
La Comercial	$2,000,000	$300,000	500	75	13.33	....	....	124
La Española	$2,000,000	$200,000	100	10	100	50	50	140
La Francesa	$2,000,000	$200,000	500	50	8	10	10	110
Franco-Chilena	$1,000,000	$560,000	25	14	12.1	....	7.1	22
Internacional Chile	$1,000,000	$1,000,000	25	25	34	....	14	82
La Italia	$2,500,000	$500,000	500	100	20	50	50	213
La Nacional	$2,000,000	$100,000	500	25	200	20	20	520
La Protectora	$3,000,000	$150,000	500	25	140	....	....	300
La Unión Chilena	$2,000,000	$200,000	500	50	100	50	50	520
La Previsora	$2,000,000	$200,000	10	10	....	....	....	20
MARITIME SHIPPING COMPANIES.								
Sud-Americana de Vapores	$7,500,000	$7,500,000	100	100	38	28	28	600
Compañía de Diques	$800,000	$800,000	100	100	14	14	4	250
MISCELLANEOUS.								
Cervecerías Unidas	$14,000,000	$14,000,000	100	100	....	15	15	247
Azucar de Viña del Mar	£235,000	£535,000	1	1	$8.65	$2.10	$2.10	64
Azucar de Penco	£225,000	£225,000	1	1	$9.85	$8.45	$3	103
Buques y Maderas	$2,500,000	$3,500,000	50	50	10	3	3	43
Maestranza y Galvanización	£120,000	£120,000	1	1	....	....	$2	12½
Compañía Industrial	$2,500,020	$2,042,400	60	60	16.66	16.66	16.66	130
Imprentas Unidas	$5,000,000	$5,000,000	100	100	....	2	2	80
Molinera Globo	$5,000,000	$5,000,000	100	100	....	....	6	55
Pan y Galletas Hucke	$250,000	$250,000	20	20	75	....	5	36
Cia. Telégrafo Comercial	$300,000	$3,000,000	25	25	14	....	7	31
Maderera Malvoa	$4,000,000	$4,000,000	20	20	3½	....	3	13
Chilena de Tabacos	$7,500,000	$7,500,000	20	20	20	10	10	43
Cemento Melón	£210,000	£210,000	1	1	30	20	5	75
Punta de Lobos	$900,000	$900,000	50	50	21	8	4	70

COLOMBIA.

BUCARAMANGA GOLD & GENERAL MINING CO. (LTD.).

Registered in 1899 in Paris. Owns mines in Republic of Colombia. Development work is in progress.

Capitalization.—£155,030 shares (par £1).

Income account.—None yet published.

Secretary, T. E. Ingledew, 60 Watling Street, London, E. C.

COLOMBIAN MINING & EXPLORATION CO. (LTD.).

Registered 1908 to acquire, at an annual rental of £3,200, gold and silver mining rights, covering 900 square miles in Supia and Marmato districts, Colombia. Estimated ore reserve, 1914, about 136,000 tons. Receiver appointed March 19, 1915. Earnings year ended March 31, 1914, £37,241.

Capitalization.—£450,000 shares, par £1, and £50,000 6 per cent debentures, interest March and September. Bonds convertible into shares to December 31, 1917, at 10s. per share.

Officers.—Secretary, T. E. Pascoe, office 6 Surrey Street, Strand, London, E. C. Manager, N. L. Jenks, Marmato Mines, Medellin, Colombia.

COLOMBIAN NORTHERN RAILWAY (LTD.).

Registered 1898. Holds a concession from the Colombian Government, expiring December, 1983, for the construction and operation of a line of railway extending from Bogota northward to Nemocon (about 37 miles). The company held a concession for the extension of the line to Chiquinoquira, about 64 miles farther. This concession has been disposed of to the Colombian Central Railway, in which company the Colombian Northern holds an interest consisting of shares and £20,000 debenture stock (6 per cent).

Capitalization.—Ordinary shares, £300,000 (par £10); 5 per cent first-mortgage debenture stock, £180,000; reserves, June 30, 1915, £27,000, including £9,000 against advances to the Colombian Central Railway.

Stores in hand, £13,297; sundry debtors, £12,314; advances to Colombian Central Railway (secured by £20,000 debenture stock), £17,748; investments (at market), £12,628; remittances in transit, £5,174; cash, £10,435; sundry creditors, £6,898; debenture fund, £3,172.

The following figures show the working results (years ended June 30): Gross receipts—1914–15, £53,864 8s. 2d.; 1913–14, £53,998 15s. 5d.; decrease, £134 7s. 3d. Working expenses—1914–15, £17,149 14s. 10d.; 1913–14, £14,782 6s. 7d.; increase, £2,367 8s. 3d. Net receipts—1914–15, £36,714 13s. 4d.; 1913–14, £39,216 8s. 10d.; decrease, £2,501 15s. 6d. The percentage of the working expenses for the year 1914–15 was 31.84 as compared with 27.37 for the previous year.

Under the terms of the trust deed the company had in 1915–16 to create a fund for the redemption of the debentures, by setting aside 10 per cent of the net profits. In conformity therewith, there has been placed to such fund the amount of £3,172 7s. 9d.

After writing off to revenue account the amount of £1,274 13s. 10d. preliminary expenses, and passing the amount of £3,000 to reserve account, the balance of net revenue is £43,514 11s. 1d.

Dividend on the shares of 4 per cent paid on December 1, 1915, amounted to £12,000, leaving a balance of £31,514 11s. 1d. to carry forward.

CONSOLIDATED COLOMBIA PLATINUM & GOLD MINES (LTD.).

Registered November 17, 1915. Acquired properties of the Colombia Gold & Platinum Syndicate (Ltd.) and the Colombian Goldfields (Ltd.). A very large area is covered, alluvial and dredging.

Capitalization.—£100,000 shares, par £1.

Directors.—E. Cattanach, S. T. Cohn, H. Edwards, T. J. Ive, G. H. Short; secretary, W. E. Hollodge, 49–51 Eastcheap, London, E. C.

ENGLISH SAN ANDRES GOLD MINES (LTD.).

Registered 1909. Controls the San Andres, San Cayetano, Penoles, and other gold-mining properties in Colombia.

Capitalization.—£35,000 shares, par £1, all fully paid.

Bullion sales year ended August 31, 1914, £3,906.

Directors.—M. Devenish, chairman; F. Varley; manager, W. E. Rowlands; secretary, H. T. Butcher, 14 Copthall Avenue, London, E. C.

FRONTINO & BOLIVIA GOLD MINING CO. (LTD.).

Registered 1911. Mining rights acquired over 12 square miles and surface rights over about 40 square miles in the Republic of Colombia.

Capitalization.—£23,390 preference shares and £140,000 ordinary shares (par £1); £45,138 19 per cent debenture stock due 1921. Preference shares are entitled to 10 per cent per annum cumulative in priority to the ordinary shares. After 19 per cent is paid on the latter class, both issues share pro rata in all further dividends. Full dividends are paid on the preference shares; 10 per cent was paid on the ordinary shares in 1915.

Income account.—Year ended June 30, 1915 (submitted December, 1915): Profit (after depreciation), £20,891; net income (including balance brought forward and interest received), £22,358; debenture interest, £4,514; surplus, £17,844; dividends, £16,359; balance, £1,505. Profit, 1914, £10,877. Shares listed on London Stock Exchange.

Directors.—S. W. Stephens, chairman; T. H. Alexander, H. P. Harris, M. P., R. C. Lyell, Capt. H. O'Neill, M. P.; secretary, J. J. Truran, Gresham House, Old Broad Street, London, E. C. Manager, A. N. Mackey, A. R. S. M., La Salada, Colombia.

NECHI MINES (LTD.).

Registered 1914. Acquired and are working the San Francisco alluvial gold properties situated on the River Nechi, at Zaragoza, Department of Antioquia, Colombia. The mines adjoin the properties of the Pato Mines (Ltd.). Consideration, £20,000 cash and £70,000 shares paid to the Oroville Dredging Co. (which see). The property consists of approximately 400 acres of gold-bearing lands. About one-sixth of this area has been tested and indicates a yield of about $5,000,000 from 6,855,900 cubic yards. The costs are estimated at $0.09 per cubic yard. The remainder of the property is also expected to produce good results. A dredge has commenced work.

Capitalization.—£140,000 preference shares (par £1) and £70,000 ordinary shares (par 10s.). The preference shares were offered to shareholders of the Oroville Dredging Co. (Ltd.) pro rata. These shares are entitled to all dividends until each shareholder shall receive the amount originally paid therefor; thereafter 25 per cent per annum in priority to the ordinary shares.

Property expenditure to June 30, 1915, £148,800.

Prices of preference shares, 1915.—Highest, 15s.; lowest, 8s.

Directors.—F. W. Baker, chairman; Maj. F. D. Behrend, H. D. Boyle, A. S. Elmore, T. J. Hoover; secretary, H. Richards, Salisbury House, London, E. C. Manager at mine, N. Dickerman.

OROVILLE DREDGING CO. (LTD.).

Registered 1909. Controls, among other mines, the Pato Mines of Colombia.

Capitalization.—£700,000 shares (par £1).

Dividends.—1914 and 1915, 10 per cent per annum.

Secretary, H. Richards, 441 Salisbury House, London, E. C.

ECUADOR.

ANCON OIL CO. OF ECUADOR.

Registered 1910. Acquired 4,000 acres of oil-bearing lands located at Santa Elena, Province of Guayaquil, Ecuador. Oil found at shallow depths. Operations temporarily suspended in 1913 owing to lack of funds. The shareholders of this company during 1913 subscribed for the £4,565 outstanding shares of the Ecuador Drilling Co.

Capitalization.—Authorized, £250,000 (par £1); outstanding, £81,060.

No accounts have been rendered recently. The wells are presumably idle.

Directors.—J. G. Raphael, chairman; L. Clerc, E. M. Court, E. Paix, J. J. de Vcaza; secretary, M. Balmuth, 6 Broad Street Place, London, E. C.

ZARUMA MINING CORPORATION (LTD.)

Registered 1913. Acquired the Minas Nuevas claims, 1,838 acres, located in the Zaruma district, Province of El Oro, Ecuador, 32 miles from the Pacific Ocean. On the two claims it is estimated that 78,000 tons of ore have been blocked out and 73,000 tons partly developed. Estimated value of ore, £10 to £12 per ton. A concentration plant and a hydroelectric plant are being constructed.

Capitalization.—£110,000 preferred ordinary shares (par £1) and £10,000 deferred shares (par 1s.); mortgage, £7,572. The preferred shares are entitled to 10 per cent per annum (noncumulative) and to one-half of additional profits.

Accounts not yet published.

Directors.—J. Rey, chairman; C. Brault, P. J. E. E. Chambost, A. E. Lund, E. Saladin, J. Ville; secretary, J. C. Stampfer, 156 Palace Chambers, Westminster, London, S. W.

BRITISH GUIANA.

CONSOLIDATED RUBBER & BALATA ESTATES (LTD.).

Registered September, 1909, to acquire concessions for collecting and producing rubber and balata in the colony of British Guiana. Concessions cover 35,000 square miles.

Capitalization.—Authorized: Seven per cent cumulative participating preference shares, £240,000; £10,000 ordinary stock. Practically all of this stock is outstanding.

Dividends and earnings.—Full dividends of 7 per cent per annum were paid September, 1909. to September, 1912, on the preference shares. In May, 1915, 3½ per cent was paid, leaving 15¾ per cent back dividends unpaid. A dividend of 16⅔ per cent was paid on the ordinary stock in 1911.

Profits.—1914, £11,978; 1913, £262.

Production.—1914, 1,076,067 pounds; 1913, 899,993 pounds.

Directors.—R. Taylor, chairman; Henry Shields. H. A. Franklin, A. S. Collard, L. Oury; secretary, James Edwards, 80 Bishopsgate, London, E. C.

DEMERARA & COVERDEN PRODUCE CO. (LTD.).

Registered August, 1912, as a consolidation of the Coverden Rubber & Produce Co. (Ltd.) and the Demerara Rubber Co. (Ltd.), owning upward of 3,000 acres of rubber, balata, and gum lands and having rights to gather these commodities elsewhere.

Capitalization.—£275,296 shares; par, 2s.

No dividends.

Secretary: H. M. Graham, 147 Leadenhall Street, London.

GUIANA GOLD CO. (LTD.).

Registered 1905. Successor to the British Guiana Exploration Co. Owns four dredges on River Conawaruk. Gold production: 1912–13, 9,162 ounces; 1913–14. 7,407 ounces; 1914–15, 8,342 ounces.

Capitalization.—£50.000 shares (par £1).

Dividends.—1908–9 to 1911–12, inclusive, 10 per cent per annum; 1912–13, 10 per cent plus 5 per cent extra; 1913–14, 7½ per cent; 1914–15, 7½ per cent. Reserve. £2,000. Surplus, 1914–15 (after depreciation), £4,150.

Secretary: J. Peters, 14 Devonshire Square. London, E. C. Mine manager: J. Henderson, St. Mary's Camp, British Guiana.

DUTCH GUIANA.

VAN EMDEN GOLD MINES (LTD.).

Registered 1912 to acquire leases until 1941 of 12,500 acres of alluvial and quartz gold-mining properties situated in Dutch Guiana. Sluices are being erected and development work is being carried on. The properties are known as the Lesser Mountain concessions and are about 150 miles southeast of Paramaribo, the capital.

Capitalization.—£30,000 shares, par 5s.

Income accounts.—Not yet rendered. Balance sheet as of September 30, 1914, showed preliminary and development expenses, £5,915; bills receivable, £5,864.

Directors.—A. R. Clements, Paramaribo, Dutch Guiana, and F. R. Marshall, London. Offices: Paramaribo and 23 Philpot Lane, London, E. C.

PERU.

APORAMA GOLDFIELDS (LTD.).

Registered 1910. Acquired alluvial rights on gold placer deposits, covering an area of 1,277 acres, located near the Hauri Hauri River, Province of Sandia, Peru. Company reached production stage just prior to the declaration of war in Europe, which prevented the raising of further capital. In consideration of constructing and keeping in repair the road leading to the mine, the company will receive about 220,000 acres of land from the Government. Property was leased to J. Chaorez, of Lima, Peru, at a rental of all taxes and 25 per cent of the net profits.

Capitalization.—£40,000 preference shares and £260,000 ordinary shares authorized, latter issue outstanding. Preference stock, when issued, will be entitled to 2 per cent per annum and will share with ordinary stock in further dividends. Loans and bills payable December 31, 1914, £33,458.

Directors.—Capt. W. B. McTaggart, chairman; J. F. D. Bowden, M. Chavel, M. Rhys Jones; secretary, J. Stap. Office: 1 Broad Street Place, London, E. C.

BACKUS & JOHNSTON BREWERY CO.

Registered 1889 to take over the brewery and ice business of Backus & Johnston at Lima, Peru.

Capitalization.—Authorized and outstanding: Ordinary stock (par £10), £110,000; founders' shares, £100. The ordinary stock is entitled to 7 per cent per annum, cumulative, and to one-half the balance of profits. In addition, £88,400 5 per cent first debenture stock and £65,000 7 per cent income debenture stock is outstanding.

Dividends.—On ordinary stock: 1908–9, 5 per cent; 1909–10, 7 per cent; 1910–11, 8 per cent; 1911–12, 9½ per cent; 1912–13 and 1913–14, 7 per cent; 1914–15, none.

Income account.—Year ended March 31, 1915: Gross profits, £17,888 (this is a much smaller amount than for previous year and reflects war conditions). After all expenses, interest payments, and £3,000 depreciation written off, the surplus was £4,863; including £2,314 carried forward, the surplus was £7,177. From this surplus £4,550 was deducted account of interest on income bonds.

Directors.—J. Lloyd, chairman; F. W. Bishop, managing director; W. F. Leese, J. Guthrie Reed, H. W. Sillem, all of London; H. Mason and J. Reed, Lima, Peru; secretary, F. W. Bishop, London. Office: 9 New Broad Street, London, E. C., and Lima, Peru.

CERRO DE PASCO COPPER CORPORATION.

The Cerro de Pasco Copper Corporation was incorporated in New York October 26, 1915, as the successor to the Cerro de Pasco Investment Co., controlling the Cerro de Pasco Mining Co., the Cerro de Pasco Railway Co., and the Morococha Mining Co. The holding company carried on its books assets valued at $38,632,439, including $3,429,821 cash, $1,600,930 accounts receivable, $3,442,965 copper, gold, and silver on hand, $724,692 stocks of other companies, and $28,300,282 cost of properties. There was a book surplus, as of October 31, 1916, of $14,437,500.

Capitalization.—The authorized capitalization of this corporation consists of 1,000,000 shares of no par value, of which 666,666 are outstanding in the hands of the public and the balance reserved to be issued to holders of the $10,000,000 10-year 6 per cent convertible bonds at the ratio of 33⅓ shares of stock for each $1,000 bonds.

Property.—The property of the Cerro de Pasco Mining Co., which is controlled, consists of 730 mineral claims and 108 coal-mining claims. Ore reserves at these mines exceed 3,000,000 tons of copper ore, which figure, it is expected, will be considerably exceeded following further development work. It is estimated that this ore contains 253,452,000 pounds of copper and 21,745,000 ounces of silver—also gold. The coal reserves are estimated at more than 3,000,000 tons. The Morococha mine is located about 100 miles from the Cerro de Pasco. It is a large producer.

Dividends.—Dividend payments for a portion of 1916 were at the rate of $1 per quarter; in March, 1917, the rate was $1 regular and $0.50 extra.

Production is running (1917) at the rate of about 74,000,000 pounds per annum, as compared with 71,000,000 pounds in 1916, 48,000,000 pounds in 1915, 42,000,000 pounds in 1914, 43,860,000 pounds in 1913, and 20,258,689 pounds in 1907.

Income account.—The income account for the 10 months ended October 31, 1916, showed sales of copper, silver, gold, etc., $19,718,164; revenue from railway, $280,348; total income, including other income, $23,697,556; operating expenses (including other expenses), $14,824,977; surplus, $8,872,579. The interest on bonds requires $600,000 per year.

The office of this company is at 15 Broad Street, New York; the mine office at Cerro de Pasco, Peru. An office is also maintained at Lima, Peru.

CHIMBOTE COAL & HARBOUR CO. (LTD.).

Registered 1908. Acquired a concession to construct a line of railway between the port of Chimbote (one of the best harbors in Peru) inland through a rich mining country, the total length to be approximately 150 miles. A portion of this line has been completed or graded, but work has been held up owing to difficulties between the company and the Peruvian Government. The company owns a majority of the shares of the Chimbote Mole Co.

Capitalization.—Authorized, £200,000 shares, par £1, of which £150,000 (approximately) are outstanding; loans, £25,000.

Directors.—R. Taylor, chairman; F. Bocerra; secretary, R. Goode. Office: 16 Gracechurch Street, London, E. C.

FERROBAMBA (LTD.).

Registered 1909. Acquired the Ferrobamba, Copper Queen, Bonanzas, Charcas, and other copper claims in the district of Ferrobamba, Province of Cotobambas, Department of Apurimac, Peru (not far from Cuzco).

Capitalization.—£120,000 ordinary shares (par £1); £30,000 priority shares (par 10s.). The priority shares were sold at par and are entitled to dividends up to 15s. per share in priority to ordinary shares, and thereafter rank as ordinary shares. The company estimates ore in mines at upward of 12,000,000 tons, valued at about £28,000,000. Mine closed down in 1912 owing to lack of working capital.

Secretary: F. F. Fuller, Salisbury House, London, E. C.

LAGUNITOS OIL CO. (LTD.).

Registered 1910. Acquired an area of 4 square miles at Lagovista, about 11 miles from the port of Talara, Peru, under a lease until 1945. The lessor is the London & Pacific Petroleum Co. In 1913 about 4 square miles of additional property was acquired. A light railway connects the property with another railway running to Talara. A large amount of drilling has been done, and the property is now on a full operative basis. During 1914 the property was acquired by the International Petroleum Co., one of the Standard Oil group. In 1916 the Lagunitos Oil Co. (Ltd.) was dissolved and the undertaking assumed by the International Petroleum Co.

Capitalization.—The capitalization of the company prior to the dissolution consisted of £90,000 preference and £200,000 ordinary. In 1913–14 37½ per cent was paid on the preference shares and in 1914–15 20 per cent.

INCOME ACCOUNTS.

Items.	1913-14	1914-15
Net receipts	£45,870	£35,344
Depreciation	25,955	17,183
Surplus	19,915	18,161
Dividends	18,489	18,000
Carried forward	2,489	2,650
Oil produced ... tons	39,650	41,930

LIMA RAILWAYS (LTD.).

This company was incorporated in 1865 to work two short steam railway lines, total mileage 17½, in the Republic of Peru. At the present time the lines are being operated by both steam and electricity. In 1907 the properties were leased until 1952 to the Empress Eléctricas Asociadas.

Capitalization.—December 31, 1915: Share capital, 40,000 shares of £10 each, £400.000; debenture stock, 5 per cent, amount issued £100,000, outstanding £52,983 (balance redeemed through sinking-fund operations).

INCOME ACCOUNTS (CALENDAR YEARS).

Items.	1912	1913	1914	1915
Receipts from rental, Chorrillos agreement, etc	£15,628	£14,956	£14,592	£16,308
Balance to net revenues after deducting Peruvian and London expenses	11,535	12,237	11,740	13,802
Net, including balance brought forward, etc	11,698	12,515	13,222	16,176
Interest, sinking fund, income tax, etc	11,743	5,465	5,307	8,839
Surplus	−45	7,050	7,915	7,337
Dividends ... 1½ per cent	....	6,000	6,000	6,000

Rolling stock on hand April 25, 1913 (latest figures obtainable): 27 locomotives and tenders; 65 passenger coaches and tramcars; 300 freight-train cars.

Directors.—Lt. Col. A. Brooke, chairman; Edw. W. Lane, Samuel Watkinson, Arthur H. Bartlett; secretary, Frederick G. Curtis, F. C. I. S.; representative in Peru (at Lima), B. J. Smith. London office: 23 College Hill, E. C. Lima office: 225 Calle Higuera.

LONDON & PACIFIC PETROLEUM CO.

Registered 1889. Leased until 1988 large petroleum properties in the Province of Paita, Peru. Considerable development work has been carried on; a refinery, storage tanks, a railroad, pipe lines, and a fleet of tank steamers have been provided. This property in 1914–15 passed to the control of the International Petroleum Co. (controlled by Standard Oil Co. interests).

Capitalization.—£1,000,000 shares (par £10).

Dividends.—1911, 6 per cent; 1912, 20 per cent; 1913, 22 per cent; 1914, 10 per cent.

INCOME ACCOUNTS.

Items.	1913	1914
Net profits	£161,252	£176,730
Depreciation	42,252	45,530
Surplus	119,000	131,200
Dividend	60,000	51,032

Balance transferred to reserve or written off of various accounts.

NEW CHUQUITAMBO GOLD MINES (LTD.).

Registered 1907. Owns 142 acres of gold-mining property located in the district of Cerro de Pasco, Peru, and water rights over the Taya River and affluents. A tramway, a 40-stamp battery, and a cyanide plant have been constructed. Crushings commenced in 1907. Production: 1912–13, 23,673 tons; 1913–14, 20,800 tons; 1914–15, 19,556 tons.

Capitalization.—£50,000 shares authorized; £44,800 outstanding (par £1).

Profits.—1912–13, £2,320; 1913–14, £3,506; 1914–15, £2,200. Gold output, 1914–15, £12,999.

Dividends.—1907–8, 6 per cent; 1908–9, 11 per cent; 1909–10, 5 per cent; 1910–11 and 1911–12, none; 1912–13, 5 per cent; 1913–14, 3¾ per cent; 1914–15, 5 per cent.

Directors.—F. Lowy, chairman and managing director; F. H. McCardie, F. E. Macfadyen; secretary, W. Holt. Office: Salisbury House, London, E. C. Manager: S. Bonany, Cerro de Pasco, Peru.

PERUVIAN CONSOLIDATED GOLD TRUST.

Registered 1911, as the Patez and Parcoy Syndicate (Ltd.), to acquire 20 mining claims at Parcoy, Peru. A plant has been erected and the company has commenced development work.

Capitalization.—Authorized, £80,000; issued, £76,047.

Income accounts.—Not yet published.

Directors.—S. R. Adcock, J. S. Enright, H. W. Whyte, A. S. Plews; general manager, A. G. Plews; secretary, E. T. Evans. Office: 11 and 12 Finsbury Square, London, E. C.

SAN ANTONIO DE ESQUILACHE MINES (LTD.).

Registered November, 1914. Acquired the San Antonio de Esquilache gold, silver, and lead mines (area 365 acres), located near Puno, Peru, on the Peruvian Southern Railway and Lake Titicaca; £1,500 cash and £208,700 shares.

Capitalization.—£250,000 shares authorized (par £1); approximately £215,000 outstanding. Ore is being shipped, but report has not yet been issued.

Directors.—H. J. Hardy, chairman; W. Bartlett, P. Belin, jr., Sir V. Chirol, Capt. R. Johnstone-Stirling, S. F. Edge, J. G. Green, W. S. Payne; secretary, H. C. Rogers. Office: 13 St. Helen's Place, London, E. C.

QUOTATIONS AND DIVIDENDS OF SECURITIES.

The following table, from the official quotation sheet, shows the quotations and recent dividends of securities listed on the Lima (Peru) Stock Exchange March 15, 1917. It should be noted that the libra, or Peruvian pound, in which the figures for capitalization and market value are expressed, is equivalent to the pound sterling ($4.8665 in United States currency). Libra=10 soles, sol=100 centavos. The abbreviation Lp. represents the Peruvian pound.

OBLIGATIONS OTHER THAN STOCKS.

Obligations.	Capital.		Dividends.		Market value.
	Issued.	Outstanding.	1915	1916 [a]	
DEBT OF STATE.	*Peruvian pounds.*	*Peruvian pounds.*	*Per cent.*	*Per cent.*	*Peruvian pounds.*
Deuda Interna Consolidada	3,623,260	2,660,645	1	[b]½	12.600
Deuda Nacional de Amortización	4,389,215	574,610			13@17
CEDULAS AND BONDS.					
Cedulas Hipotecarias:					
Banco Internacional del Peru—					
8 per cent		5,100	8	8	103
7 per cent		14,350	7	7	100
Banco Italiano, 6½ per cent		80,730	6½	6½	97.500
Credito Hipotecario del Peru—					
8 per cent		133,980	8	8	103
6½ per cent		49,250	6½	6½	
Empresas Eléctricas Asociadas	1,200,000	1,091,160	5½	5½	
Compañía Peruana de Vapores y Dique del Callao	350,000	311,720	6	6	
Same	250,000	150,000	8	8	92.500
Tranvía Eléctrico de Arequipa	75,000	67,200	4		
Sociedad Agrícola San Nicolás	80,000	20,900	8	8	101
Sociedad Industrial "La Estrella"	30,000	26,550	8	8	
Same, second loan	32,000	32,000	6		
Sociedad Industrial "Infantas"	85,000	78,200	8	8	
Ingenio de Azúcar Buen Pastor	50,000	600	9	9	
Ingenio Azucarero de Huaura	15,000	15,000	8	8	
Inca Cotton Mill Co. (Ltd.)	53,200	30,500	8	8	
Fábrica Nacional de Tejidos Santa Catalina	90,000	61,600	8	8	101
Empréstito del Colegio de Guadalupe	80,000	56,450	8	8	
Compañía del Teatro Municipal	5,320	4,440	8	8	
Empréstitos del Ferrocarril Supe-Barranca R.A.	30,000	29,100	8	8	102

[a] 1916 dividends in some instances are for part of year only.
[b] Fixed annual dividend.

SHARES.

Names of enterprises.	Capital.		Par.		Dividends.		Market value.
	Total.	Reserves.	Nominal.	Paid in.	1915	1916	
BANKS.	*Peruvian pounds.*	*Peruvian pounds.*	*Peruvian pounds.*	*Peruvian pounds.*	*Per cent.*	*Per cent.*	*Peruvian pounds.*
Peru y Londres	500,000	700,000	10	10	3		11
Italiano	200,000	299,800	10	10	7	10	12.500
Internacional del Peru	100,000	125,000	5	5	4	4½	3.300
Popular del Peru	200,000	207,700	2	2	5	7	2.200
Crédito Hipotecario del Peru	50,000	22,912	10	4	12	14	
TAX-COLLECTING COMPANIES.							
Administradora del Guzno	30,000	15,000	1	0.5.00	10	[a] 5	0.500
Salinera del Peru	100,000	55,380	1	0.4.00	12	12	0.550
Administradora de los Almacenes Fiscales	100,000	25,000	1	0.2.50	10	Lp. 0.025	0.250
Recaudadora de Impuetos	1,500,000	1,350,000	10	9	Lp. 0.800	Lp. 0.800	8.800
INSURANCE COMPANIES.							
Internacional del Peru	200,000	93,101	10	1	40	40	5.700
Rimac	250,000	111,414	10	1	30	30	5.500
Italia	200,000	928	10	1	10	15	2
La Nacional	250,000	40,001	10	0.8.00		7	0.800
La Popular	200,000	52,100	10	1	8	8	1.500
Unidas de Seguros	500,000	70,000		2.8.00		30	2.300

SHARES—Continued.

Names of enterprises.	Capital.		Par.		Dividends.		Market value.
	Total.	Reserves.	Nominal.	Paid in.	1915	1916	
AGRICULTURAL ENTERPRISES.	*Peruvian pounds.*	*Peruvian pounds.*	*Peruvian pounds.*	*Peruvian pounds.*	*Per cent.*	*Per cent.*	*Peruvian pounds.*
Sociedad Agricola San Nicolas..	160,000	160,000	10	10	16	6	9
Sociedad Industrial "La Estrella"	110,000	44,000	10	10	....	....	....
Sociedad Ganadera de Junín....	110,000	124,186	100	100	13	....	....
Sociedad Agrícola Paramonga..	400,000	400,000	100	100	15	....	....
Ingenio Azucarero de Huaura..	35,000	21,000	10	4. 5. 00	....	....	....
Ingenio Azucarero Corpacancha.	30,000	34,884	100	100	8	8	....
MINES.							
New Chuquitambo Gold Mines (Ltd.)	50,000	50,000	1	1	3½	*a* 5	....
MANUFACTURING ENTERPRISES.							
Fábrica de Fósforos "El Sol"..	40,000	40,000	10	10	....	....	....
Peruvian Cotton Mill Co. (Ltd.) (Vitarte)	100,000	80,183	....	1	....	10	....
Fábrica de Sombreros "Fénix".	9,963	9,963	1	1	8	....	....
Comp. Ind. A. Field y La Estrella (Ltd.)	48,500	33,500	....	10	....	....	....
Soc. Curtbre a Vapor de Monserrate	17,200	17,200	10	10	....	....	....
TRANSPORTATION COMPANIES.							
Empresa del Muelle de Tambo de Mora	25,000	25,000	1	0. 7. 20	11	....	....
Compañía Peruana de Vapores y Dique del Callao	300,000	300,000	1	1	....	Lp. 0.1. 60	.850
PUBLIC-UTILITY ENTERPRISES.							
Empresa del Agua del Barranco.	20,000	20,000	10	10	6	6	....
Empresa del Agua de Miraflores.	8,000	8,000	20	20	....	6	....
Empresa del Agua de Paita y Colan	6,000	6,000	0. 9. 60	0. 9. 60	8	*a* 4	....
Empress de Agua Potable de Piura	10,000	10,000	1	0. 9. 36	3	....	....
Empresas Eléctricas Asociadas..	1,500,003	1,771,898	5	5	....	*a* 2	2. 750
MISCELLANEOUS.							
Compañía Urbana Cocharcas...	20,000	30,622	1	0. 4. 00	16	16	0. 530
Compañía del Teatro Municipal.	7,650	8,530	10	10	....	6	....

a Fixed annual dividends.

URUGUAY.

MONTEVIDEO GAS CO. (LTD.).

Registered 1872. Has power to generate and otherwise deal in electricity, gas, and any other illuminating agent. The company has no concession.

Capitalization.—December 31, 1915: Shares (par £20), £600,000 authorized, £541,920 outstanding; 5 per cent perpetual first-mortgage debenture stock (interest January and July), £78,440 authorized; £28,680 outstanding.

Income account.—Year ended December 31, 1915: By sales of gas, residuary products, meter and cooker rents, profits on sales of gas fittings, etc., £143,043; expenditures, £115,417; balance, £27,626; balance brought forward from 1914, £13,255; total net income (including other income), £42,925; interest and other charges, including depreciation of investments, etc., £13,405; balance before payment of dividends, £29,519. Gross receipts for 1914, £123,818; net receipts, £23,962.

The financial condition of the company was excellent on December 31, 1915. Reserve account, £32,000; insurance fund, £12,500; contingency account, £17,739.

Dividends.—1899 to 1911, 3½ per cent annually; 1912 and 1913, 4 per cent; 1914 and 1915, 3 per cent.

Directors.—Charles Hunt, chairman; Frank H. Jones, John News, W. Edgar Horne, Frank H. Jones; secretary, Henry Kearns, 9 New Broad Street, London, E. C.

VENEZUELA.

BOLIVAR RAILWAY.

This company, registered 1896, operates a line of railway from the port of Tucacas on the Caribbean Sea to Barquisimeto, an interior city of some 40,000 inhabitants. The line was originally built from Tucacas to the Quebrada (now Aroa) Copper Mines (about 50 miles). Later this line was amalgamated with the Southwestern Railway of Venezuela, which was practically an extension of the Bolivar Railway (then known as the Quebrada Railway & Copper Co.), operating from a point near the terminus of the latter to Barquisimeto. A branch line (the San Felipe branch) is under construction; it will be about 28.5 miles in length, and will pass through what is believed to be the richest valley in Venezuela.

After leaving Barquisimeto, which is a center for the produce of the Northern Andine country, the railway begins a gradual climb until Duaca (a small town) is reached. From this point a valley capable of considerable cultivation is traversed. At El Hacha, where the branch to the Aroa mines joins the main line, the traffic is greatly increased, owing to the large shipments of copper ore that are sent to Tucacas. A portion of the line passes through wild forest country, which, a short distance back from the railway, is virtually an unexplored wilderness.

The Bolivar Railway owns an estate of about 250,000 acres granted by the Government of Venezuela. The estate is to be developed fully in the near future. In 1912–13 £10,234 was expended toward the development of the estate. The steamer *Barquisimeto* and about 10 barges, lighters, etc., are owned by this company.

CAPITALIZATION, JUNE 30, 1915.

Securities.	Authorized.	Issued.
Ordinary shares (par £1)	£700,000	£683,200
Preference shares, 5 per cent noncumulative (par £1)	300,000	292,800
6 per cent debenture stock (interest March and September)	400,000	250,000

NOTE.—Securities are listed on the London Stock Exchange.

Dividends.—Preference: 1904–5 and 1905–6, 3 per cent; 1906–7, 2 per cent; 1907–8, none; 1908–9, 3 per cent; 1909–10, 3½ per cent; 1910–11, 1911–12, and 1912–13, 5 per cent; 1913–14, 5 per cent; and 1914–15, 3 per cent. In 1912–13 the ordinary stock received 2 per cent. The 1913–14 and 1914–15 preference dividends were paid in 6 per cent script convertible into 6 per cent debenture stock at par when conditions are such that debenture stock may be issued.

Income account.—Year ended June 30, 1915: Gross earnings, £87,497 (including £5,916 steamship earnings); operating expenses (including £5,831, cost of running steamers, and £3,254, London office expenses), £48,828; net revenue, £38,669; total net, £38,682; interest, income tax, etc., £19,821; estate development, £3,023; reserves, £7,000; surplus, £8,837; balance brought forward from June 30, 1914, £52,374; balance (surplus), £61,211. For the year ended June 30, 1916, gross receipts totaled £109,372.

In 1914–15 34,827,349 kilos of freight were handled, as compared with 48,582,318 kilos handled in 1913–14 (1,000 kilos=1 metric ton of 2,205 pounds).

Mileage operated.—June 30, 1915: 110 (not including 12 miles of San Felipe branch completed September, 1915).

Rolling stock.—Locomotives, 17; passenger-train cars, 17; freight and service cars, 312; motor cars, 3; steamers, 2; other floating equipment, 5.

Directors.—John Soame Austin, chairman; Nathaniel G. Burch, deputy chairman; Claude E. S. Bishop, Percy C. Quilter, James A. Goudge, John M. Macdonald; secretary, J. T. Dillon, 9 New Broad Street, London, E. C. General manager stationed at Pueblo Nuevo, Venezuela.

EL AMPERO MINE (LTD.).

Incorporated 1908 to take over the La Paz Mine, situated 12 miles east of Guacipati, capital of the Yuruari district, Venezuela (near the El Callao Mine). The area is 400 acres, heavily timbered, and the mine workings consisted in 1913 of a collection of about 25 shafts of depths varying from 30 to 90 feet. Good mining timber and firewood exist in the vicinity. A 10-stamp mill has been erected with a milling capacity up to 100 tons per day. The river and dredging concessions were acquired in 1914.

Capitalization.—Authorized, £104,000 ordinary shares (par £1); issued, £90,170 (£89,325 paid in), including £83,993 (fully paid) issued to vendors.

INCOME ACCOUNTS.

Items.	Year ended June 30—	
	1914	1915
Proceeds of gold, interest, rents, etc	£18,739	[a] £17,633
Expenses	14,645	[b] 16,197
Profits	4,094	1,436
Production ounces	5,016	2,808

[a] Proceeds of gold, £17,228.
[b] Expenses at mine, £11,059. Depreciation, £2,743 (12½ per cent).

Cash balance.—June 30, 1915: £6,894; gold on hand, £860; bills, etc., receivable, £620; sundry creditors, £533.

Directors.—H. E. M. Bourke, chairman; Gerald M. Browne, Cowley Lambert, J. A. Cipriani, Arthur Pomeroy; secretary, H. B. Cleford, 21 Great Winchester Street, London, E. C. Manager: Henry Cribb, Guacipati, Venezuela. Commercial agent: José Acquatella, Ciudad Bolivar, Venezuela.

LA GUAIRA HARBOUR CORPORATION (LTD.).

Registered 1886; reorganized 1896. The company has a concession in perpetuity, with exclusive rights until 1985 to own and operate a pier and general harbor undertaking at La Guaira, Venezuela. Extensive properties are owned and revenues are derived from lighterage, docking, handling of merchandise, and passengers, etc. The company also controls, through ownership of stock and income bonds, the Macuto & Coast Line Railway of Venezuela (Ltd.), operating a line of railway between La Guaira, Maiquetia, and Macuto, the last-named town being the principal seaside resort of the Republic. The line was formerly operated by steam but has recently been converted to electricity. Its securities are carried on the books of the La Guaira Harbour Corporation at £20,540.

Capitalization.—Ordinary shares (par £20), £400,000; 5 per cent first mortgage irredeemable debenture stock, £420,000; 5 per cent noncumulative second mortgage stock, £578,279; total, £1,398,279.

No dividends are being paid on the ordinary shares, and interest on the second mortgage stock has been paid in recent years as follows: 1912, 2 per cent; 1913 and 1914, 2¾ per cent each; 1915, 2½ per cent.

INCOME ACCOUNTS.

Items.	1912	1913	1914	1915
Gross receipts	£66,258	£74,411	£70,901	£65,347
Expenses	35,107	38,043	34,954	30,598
Net revenues	31,151	36,368	35,948	34,749
Surplus after first mortgage debenture interest	....	15,943	16,087	14,660
Tonnage handled at port	106,927	117,635	112,086	105,775
Passengers	13,924	17,671	13,273	8,216

Gross receipts in 1916 totaled £70,571 and in 1917 £74,085. The surplus for 1917, after first-mortgage debenture interest, totaled £13,817.

Directors.—Capt. W. B. McTaggart, chairman; Teofilo Rojas (representative of the British Government); T. H. Evans; Lieut. Col. F. M. Carleton, D. S. O.; J. G. B. Stone; Col. Claude Lowther, M. P.; secretary, E. J. Summers, 6 Broad Street Place, London, E. C. General manager: W. H. Andrews, La Guaira, Venezuela.

MACUTO & COAST LINE RAILWAY.

This railway, operated by electricity (until recently operated by steam) extends from La Guaira (where connections are afforded with the La Guaira & Caracas Railway) to Marquetia and Macuto. This is a passenger line handling the traffic to and from Macuto, the principal seaside resort of Venezuela (about 6 miles operated). The shares and debentures of this company are owned by the La Guaira Harbour Corporation (which see) and are carried on the latter's books at cost, £20,540.

Net revenues for 1914–15 (year ended September 30) were £2,163, as compared with £3,072 in 1913–14 and £591 in 1912–13. No dividend was paid on ordinary stock in 1914–15; 3 per cent was paid in 1913–14.

Directors.—See La Guaira Harbor Corporation (Ltd.).

NATIONAL MATCH FACTORY OF VENEZUELA (LTD.).

Registered 1905 as the Venezuela Match Monopoly (Ltd.); reregistered under present title during 1909. The company has acquired, at a cost of £206,765, the shares (5,499,000 bolivares of a total of 5,500,000 bolivares outstanding) of La Compañía Anónima Fábrica Nacional de Fósforos, which has a monopoly of the manufacture and sale of matches of all kinds within the Republic of Venezuela until 1929. The shares acquired have subsequently been canceled, and the business is now carried on directly by the National Match Factory of Venezuela proper.

Capitalization.—Shares authorized, £220,000 (par £1); outstanding, £219,967.

Cash on hand August 31, 1915 (latest figures obtainable), £10,196; loans, etc., receivable, £21,156; reserve account, £10,500; creditors, £5,321.

INCOME ACCOUNTS.

Items.	Year ended August 31—				
	1911	1912	1913	1914	1915
Gross receipts	£46,282	£50,094	£51,836	£57,546	£56,162
Balance forward from previous year	677	418	1,666	1,282	1,168
Profits applicable to dividends and reserves	13,318	17,866	18,752	18,068	15,912
Transferred to reserves	3,000	3,000	3,000	1,500	None.
Dividend paid ... per cent	4½	6	6½	7	7

Directors.—O. H. Fuerth, H. Maubourguet, A. Pam, T. M. C. Steuart; secretary, A. R. Bennett, 65 Bishopsgate, London, E. C. Other offices: Paris and Caracas (Venezuela).

NEW CALLAO GOLD MINING CO. (LTD.).

Registered, 1912, in France. Acquired properties from a previously operated company located at El Callao, in the Yuruari Valley, Venezuela.

Capitalization.—Shares, £300,000 authorized, £265,000 outstanding; debentures, 6½ per cent, £60,000 outstanding.

Income accounts.—Not yet published.

Directors.—Col. E. Aries, D. Carpentier, A. Delarbe, A. Fraisse, V. Franchische, G. Gratieux, A. Picard, G. Prudhomme (all of Paris, France). London office: 4 Cullum Street, London, E. C.

PUERTO CABELLO & VALENCIA RAILWAY CO. (LTD.).

Registered 1885. Line extends from Puerto Cabello to Valencia, Venezuela (34 miles). Opened for traffic 1888. There is no option for Government purchase. Report for 1915 claims £350,761 from Government as guaranties for years 1905 to 1915; these claims are to be settled by arbitration.

INCOME ACCOUNTS.

Items.	1913	1914	1915
Gross receipts	£43,750	£40,040	£42,677
Expenses	25,121	26,654	27,544
Net revenues	18,629	13,386	15,133

Miscellaneous income, 1915, £702; total net income, £15,835; amount carried forward from 1914, £383; interest paid, 5 per cent on first-charge debentures and 4½ per cent on second-charge debentures, £7,650; balance, £69; debit balance to revenue account, £11,926.

Capitalization.—£460,000 ordinary shares, par £10; £170,000 first-charge 5 per cent coupon bonds due 1955 (£20,000 additional in treasury), par £50 and £100; £170,000 5 per cent second-charge debenture stock; total, £820,000. The first-charge bonds are redeemable at par at company's option. The second-charge debenture stock receives interest when earned, this interest being cumulative. Interest has been paid as follows: 1 per cent in 1905; 8s. 4d. in 1910; 16s. in 1911; 4¾ per cent in 1912; 5 per cent in 1913; 3¼ per cent in 1914; 4½ per cent in 1915.

Coffee, meat, and coal were the principal commodities handled in 1915.

Equipment.—December 31, 1915: Locomotives, 11; passenger-train cars, 13; freight cars, 96; other cars, 2.

Directors.—Nathaniel G. Burch, chairman; Samuel Watkinson, John Matheson Macdonald; G. A. P. Pilditch, managing director and secretary, Finsbury Pavement House, London, E. C. General manager: W. A. Littell, Valencia, Venezuela.

UNITED ELECTRIC TRAMWAYS CO. OF CARACAS (LTD.).

Registered 1906. A holding company of the shares (1,272, of a value of £168,245) and of a mortgage (6 per cent per annum, value £170,000) of the Compañía de Tranvías Eléctricos de Caracas. The latter company operates about 16½ miles of electric tramway lines in the city of Caracas, Venezuela.

Capitalization.—Shares, £200,000 authorized and £170,000 outstanding, par £1; 5 per cent first-mortgage debenture stock due 1950, £200,000 authorized and £170,000 issued, of which £163,250 remained outstanding June 30, 1915. There is a sinking fund of ½ per cent per annum purchasing this debenture stock in the market or calling same at not more than 105.

The results of operating the line were as follows: Gross receipts—1914–15, 1,426,679 bolivares; 1913–14, 1,550,587 bolivares. Net receipts—1914–15, 693,665 bolivares (£27,471); 1913–14, 801,967 bolivares (£31,761).

Of the profits for 1914–15, 50,000 bolivares were transferred to reserve and the balance paid to the holding company as interest and dividend. Including other income, the holding company received £25,338, of which £10,896 was paid as interest, sinking fund, and other expenses. The surplus was £14,543. Passengers carried during 1914–15 numbered 4,992,210 (1913–14, 5,391,809). Cars in service, 48.

Dividends.—1912–13, 5 per cent; 1913–14, 11 per cent; 1914–15, 7 per cent and 1½ per cent extra.

Directors.—Maj. Gen. Ivor Philipps, D. S. O., M. P., chairman; Sir Douglas Fox, Percy Cross, London; Edgar Allan Wallis, Caracas, Venezuela; secretary, A. J. Shepherd, 9 New Broad Street, London, E. C.

VENEZUELA ELECTRIC LIGHT CO. (LTD.).

This company owns electric lighting and gas plants in Caracas, Venezuela. The company holds an exclusive contract to light the city of Caracas until 1937. Two hydroelectric stations are owned. The property is operated by the J. G. White Co. (Ltd.) as managers, and is controlled by the International Light & Power Co. (which see).

Capitalization.—$900,000 stock and $900,000 first-mortgage debenture stock (all securities owned by the International Light & Power Co. (Ltd.), of Canada).

Income account.—Year ended June 30, 1915: Net earnings, £22,210 (£22,759 in 1913–14); deductions for renewals and general reserves, £4,058; surplus carried to balance sheet of International Light & Power Co., £18,152 (£18,514 in 1913–14).

Directors.—See International Light & Power Co.

VENEZUELA TELEPHONE & ELECTRICAL APPLIANCES CO. (LTD.).

Registered 1890 as successor to the Inter-Continental Telephone Co., of New Jersey, U. S. A. The company's concession gave exclusive privileges until 1914. These privileges have not been renewed. The ownership of the property is perpetual, however.

CAPITALIZATION, JUNE 30, 1915.

Securities.	Authorized.	Outstanding.
Ordinary shares (par £1)	£70,000	£70,000
Cumulative 8 per cent preference shares	15,000	8,600
6 per cent prior lien debentures (matured July 1, 1915; payment of principal deferred).	30,000	30,000
5 per cent first mortgage debentures (due Oct. 1, 1925)	70,000	70,000
7 per cent second mortgage debentures (due 1940)	20,000	20,000

a Includes £7.100 deposited as security against loan. Secured loans amounted to £22.338

Telephone receipts.—Years ended June 30: 1900, £23,892; 1905, £22,768; 1910, £24,393; 1911, £25,854; 1912, £27,967; 1913, £31,648; 1914, £34,824; 1915, £37,612.

Income account.—Year ended June 30, 1915: Receipts, including other income, £39,736; net income, £17,644; operating and London office expenses, £22,092; interest and income tax, £7,676; surplus, £9,968. A total of £10,434 was carried forward from 1913–14, making surplus £20,401. Out of this surplus £2,580 (less income tax) was paid as a dividend of 30 per cent on the cumulative preference shares, liquidating dividends in arrears to December 31, 1906. In addition, £6,000 was credited to reserve for renewals and depreciation.

Directors.—Sir Douglas Fox, chairman; J. S. Austin, C. E. S. Bishop, H. S. Simmonds; secretary, R. J. Beevor, 9 New Broad Street, London, E. C.

Appendix B.—CENTRAL AMERICA AND THE WEST INDIES.

COSTA RICA.

COSTA RICA COFFEE ESTATES (LTD.).

Registered 1897. Owns large coffee estates in the Republic of Costa Rica. About 365 acres are under cultivation.

Capitalization.—June 30, 1914 (latest available): Stock (par £10), £50,000 authorized, £30,560 outstanding; debentures, £10,000 authorized, £5,000 outstanding (an additional £4,000 deposited as security for loans); loans, £10,750 outstanding.

Income account.—Year 1913–14 (latest reported): Receipts, £3,946; expenses, depreciation, etc., £6,348; loss, £2,402; debit balance to carry forward, £10,186.

Dividend.—A 3 per cent dividend was paid in 1903–4; none since.

Directors.—A. J. Shepherd, chairman; Kenneth Reid, Dr. A. F. Pirie; secretary, R. J. Beevor. Office: 9 New Broad Street, London, E. C.

COSTA RICA ELECTRIC LIGHT & TRACTION CO. (LTD.).

Registered 1898. Operates electric lighting and electric tramway properties located in the city of San Jose and in the central valley of Costa Rica. The tramway line is 10 miles in length. The municipality of San Jose will take over the tramway lines, without cost, in 1956, the lighting undertaking remaining the property of the company in perpetuity.

Capitalization.—June 30, 1915: Authorized and issued, £130,000 ordinary shares (par £1); prior lien 6 per cent debentures, £98,900 (£1,100 additional redeemed out of sinking fund), sinking fund suspended until one year after close of European war, issue to be retired on or before July 1, 1954; 5 per cent first debentures, £230,000 authorized, £197,150 issued, £187,750 outstanding (balance retired through sinking fund, which was suspended 1912 to 1916), principal repayable on or before January 1, 1948.

Income account.—Net earnings, 1914–15, £21,663; interest, discount, London expenses, etc., £17,839; balance, £3,824; net earnings, 1913–14, £26,352; profits, £8,057; profits, 1912–13, £7,338; 1911–12, £5,732. The earnings in 1914–15 were affected by adverse exchange conditions.

Directors.—W. F. Leese, Frederick Davies, F. M. Crisp, C. A. Vansittart, F. Witting; secretary, I. Zillhardt, 9 New Broad Street, London, E. C. Costa Rica office: San Jose.

HONDURAS.

ANTIGUA GOLD & COPPER CO.

Hibernia Bank Building, New Orleans, La. Mine located at Minas de Oro, Comayagua, Honduras. Owns approximately 531 acres of land carrying gold, silver, and copper.

Capitalization.—$2,000,000; par $5.

Officers.—O. M. Dunn, president; James L. Wright, vice president; L. S. Scott, secretary and treasurer.

NICARAGUA.

BABILONIA GOLD MINES (LTD.).

Registered December, 1911. Owns three mining claims—the Crimea, the Babilonia, and the Santa Maria—located at La Libertad, Chontales District, Nicaragua. Tons milled, 7,675. Ore reserves, December 31, 1914, estimated at £59,980.

Capitalization.—£200,000 shares authorized, £170,007 outstanding; par £1.

Operating results.—Year 1914 (after depreciation), loss £17,274; year 1913, profit £3,705; debit balance carried forward, £13,400.

Directors.—T. J. Hoover, chairman; J. A. Agnew, J. H. Cordner-Jones, A. F. Kuehn, A. Pomeroy; secretary, G. G. Hay, 1 London Wall Buildings, London, E. C.

CENTRAL AMERICA GOLD FIELDS SYNDICATE.

Registered 1914. Acquired options on five groups of gold mines in Pis Pis district of Nicaragua. Not worked at present.

Capitalization.—£5,000 stock, par £1, and £10,000 7 per cent notes (income).

Secretary: G. G. Hay, 1 London Wall Buildings, London, E. C.

CENTRAL AMERICAN MINES (LTD.).

Registered 1913 as a reconstruction of the Oroya Leonesa (Ltd.). Owns gold-mining properties near Matagalpa, Nicaragua. A 20-stamp mill and various plants have been erected.

Capitalization.—£150,000 shares, par 5s.; 6 per cent debenture bonds, £35,000, redeemable at par November 30, 1917, convertible into shares at par until redemption.

Yield for 13 months ended December 31, 1914, £38,279 (31,556 tons). Ore reserves, 83,606 tons.

Directors.—T. J. Hoover, chairman; J. A. Agnew, J. H. Cordner-Jones, A. F. Kuehn, A. Pomeroy, W. F. Turner; secretary, G. G. Hay, 1 London Wall Buildings, London, E. C. Manager at mine: C. E. Bunker.

SALVADOR.

BUTTERS SALVADOR MINES (LTD.).

Registered 1912 in Canada to take over assets of a British company of same name. Assets transferred in 1914. Properties consist of an area of 547 acres of gold-bearing lands, situated not far from Santa Rosa, Salvador.

Capitalization.—$750,000 United States gold; par $5. fully paid.

Dividends.—1903–4, 55 per cent; 1904–5, 40 per cent; 1905–6, 55 per cent; 1906–7, 75 per cent; 1907–8, 80 per cent; 1908–9, 68¾ per cent; 1909–10, 45 per cent; 1910–11, 41¼ per cent; 1911–12 and 1912–13, 35 per cent each; 1914, 17½ per cent; 1915, January $0.25 regular and $0.12 extra, April, July, and October $0.25 each, total for year $1.12 or 22⅜ per cent; 1916, 22⅜ per cent.

Income account.—Year ended June 30, 1914 (report submitted December, 1915): Gross, $504,580; net, $116,041; dividends, $92,062; carried forward, $110,264.

Office: 232 St. James Street, Montreal, Canada, and 120 Broadway, New York.

See page 447.

MONTE MAYOR GOLD & SILVER MINING CO.

Registered 1911. Acquired the Monte Mayor Mines, covering an area of about 4 square miles, located near Santa Rosa, Salvador.

Capitalization.—Preference shares, £30,000 authorized, £20,297 outstanding. The preference shares are entitled to 15 per cent per annum until May, 1918, when they become ordinary shares. A dividend of 4 per cent was paid on the preference shares in 1912; none since.

No income account or balance sheet is published at present.

Directors.—J. P. Clarkson and E. L. Pullinger, London; F. Macay and E. H. Pullinger, Salvador; secretary, St. J. Bennett. Office: 16–17 Devonshire Square, Bishopsgate, London, E. C.

BRITISH WEST INDIES.

ANGOSTURA BITTERS—J. G. B. SIEGERT & SONS (LTD.).

This company handles the manufacture and sale of Angostura bitters and other cordials. With the exception of products of the sugar industry this is practically the only manufactured export of Trinidad. The total exports of bitters from the colony in 1915 amounted to 27,742 gallons.

Capitalization.—Authorized and outstanding, £85,000 6 per cent cumulative preference shares and £85,000 ordinary shares, par £1.

Dividends for the past several years have averaged 6 to 6½ per cent per annum. Reserve funds, 1913–14, £9,293; carried forward, £1,332.

Directors.—A. Henderson, chairman; R. F. Henderson, Capt. A. Lund, R. H. McCarthy, A. C. Siegert, A. G. Siegert; secretary, H. E. Perks. London address: Spencer House, South Place, E. C.

BARBADOS ELECTRIC SUPPLY CORPORATION (LTD.).

Registered 1909. The corporation, which was granted the right to construct an electric supply plant and station at Bridgetown, Barbados, has an exclusive franchise until 1949. This franchise covers all territory within 5 miles of the city. The company is supplying a large portion of the public lighting of Bridgetown, and has also obtained a contract from the government for lighting the wharves and Inner Basin. As of June 30, 1915 (latest report obtainable), there were 997 consumers, as compared with 737 in 1914, 456 in 1913, and 247 in 1912. A total of 15,036 lamps and motors were connected, as compared with 5,201 as of June 30, 1912.

Capitalization.—June 30, 1915: Preference shares, 7 per cent and participating, £40,000 (par £1); ordinary shares, £20,000 (par £1); loan secured by an issue of 7 per cent debentures, £10,000.

INCOME ACCOUNTS.

Items	Year ended June 30—		
	1913	1914	1915
Profit on sale of power, etc	£457	£1,381	£2,231
London fees, interest, etc	1,684	1,823	1,728
Profit or loss for year	−1,227	−442	+503

Directors.—A. W. Tait, chairman; G. H. J. Hooghwinkel, William C. Kenny, W. F. Leese, London, England. Advisory committee in Barbados: Hon. Sir William Chandler, Hon. J. P. Wright, Bridgetown. London office: Basildon House, Moorgate Street, E. C.; Bernard Heyburn, secretary.

DOMINICA FORESTS & SAWMILLS (LTD.).

Registered 1911. Acquired 12,500 acres of timberlands in the island of Dominica and option over additional lands, warehouses, etc. The company has planted coconut and lime trees and has partly suspended timber operations.

Capitalization.—£80.000 shares authorized (par 5s.), outstanding, £59,280; £5,000 5 per cent first debentures (par £1) have been authorized and offered for subscription at 72 per cent.

Income account.—Year ended March 31, 1915 (submitted March, 1916): Loss on working and expenditures in London, £1,112; debit balance to profit and loss, £7,888.

Directors.—H. E. Carter, chairman; C. P. Bennett, C. Temperley, A. B. Raper. Office: 53 Palmerston House, Old Broad Street, London, E. C.

GENERAL OIL FIELDS (LTD.).

Registered 1912. Acquired 1 square mile of oil properties located in the Palo Seco district, Trinidad (recently an oil property in Newfoundland was acquired).

Capitalization.—Authorized, £70,000, including £30,000 ordinary (par 5s.) and £40,000 deferred (par 1s.). The ordinary shares will receive all dividends up to 10 per cent and one-half the balance. Thus far, 21,507 ordinary and 500,000 deferred shares have been issued.

Income account.—None has been published as yet. Capital expenditures December 31, 1915, £25,411; general expenditures, £2,160; investments, £2,080; advances, etc., £720; cash, £258; calls in arrears, £180; creditors and temporary advances, £2,150.

Directors.—H. A. Clifton, A. A. G. Kendall, H. F. G. Weber; secretary, P. C. Bird, Finsbury Court, London, E. C.

MONTSERRAT CO. (LTD.).

This company, incorporated 1875, owns large lime plantations on the island of Montserrat and on other islands of the Leeward and Windward groups. It carries on an extensive business in bottled lime juice. Its properties in Great Britain are located at Birmingham.

Capitalization.—Shares authorized, £29,180; outstanding, £13,880 (£9,369 paid in); debentures, £1,000.

Income account.—Year ended June 30, 1916: After the payment of a dividend of 7½ per cent, there remained to be carried forward £810. Reserve funds, £10,607.

Dividends.—1906–7, 30 per cent; 1907–8, 35 per cent; 1908–9, 10 per cent; 1909–10 and 1910–11, 20 per cent each; 1911–12, 12½ per cent; 1912–13, 15 per cent; 1913–14, 10 per cent; 1914–15, 7½ per cent.

Directors.—W. A. Albright, chairman; R. Clark, W. King, A. T. Little, F. A. Sturge, J. Sturge (managing director). Offices: 2 Gas Street, Birmingham, England; Plymouth, Montserrat, British West Indies.

NEW TRINIDAD OIL CO.

Registered 1915. Acquired the property of the Trinidad Silverstream Oilfields (Ltd.), consisting of about 1,100 acres of oil lands, the properties being known as Malgretout, Mon Desir, and Silverstream.

Capitalization.—£75,000 authorized (par 5s.).

Accounts not yet published.

Directors.—F. King, J. K. Kelty, J. Sinclair; secretary, D. M. Purkins, 26 Victoria Street, Westminster, S. W., London.

OIL EXPLORATION CO. OF TRINIDAD (LTD.).

Registered 1915. Acquired from the International Oil Lands (Ltd.) large oil-bearing areas in Trinidad (approximately 1,040 acres).

Capitalization.—£80,000 shares authorized (par £1), £45,010 outstanding.

Income accounts not yet published.

Directors.—H. A. C. Bonar, J. Conchie, E. Nash; secretary, E. Ronaldson, 62 London Wall, London, E. C.

PETROLEUM OPTIONS (LTD.).

This company, registered in 1908, holds approximately 47,000 ordinary shares of the Trinidad United Oilfields (Ltd.) (total ordinary shares outstanding, £180,000, par £1). The investments held by the Petroleum Options (Ltd.) were valued on its books as of December 31, 1914, at £15,085, while the property of the company in Trinidad was valued at £7,487.

Capitalization.—Ordinary shares, authorized £30,000, outstanding £14,857; preference shares, 10 per cent noncumulative (par 5s.), £15,000. There are also outstanding first-mortgage debentures, with interest, £1,486. In 1915 additional shares were issued.

Profit and loss account from December 1, 1911, to December 31, 1914, showed a balance of profit (subject to realization of shares at their estimated values) amounting to £835.

Directors.—A. A. G. Kendall, chairman; H. Weber, A. Vernon Davis, H. A. Clifton; secretary, P. C. Bird. Office: Finsbury Court, London, E. C.

SOUTH NAPARIMA (TRINIDAD) OIL CO. (LTD.).

Registered 1910. Acquired about 1,044 acres of oil-bearing lands located at Barrackpore Settlement, South Naparima Ward, Trinidad. Later sold 297 acres, including two producing wells, to the Venezuelan Oilfields Exploration Co. (Ltd.), for £15,000 cash and £30,000 in preference shares and an annual royalty of 5 per cent on oil produced. The rest of the property is to be disposed of to the Trinidad Oil & Transportation Co. (Ltd.) for £66,000 in shares.

Capitalization.—£50,000 shares authorized, £47,100 outstanding.

Directors.—J. S. Smith-Winby, chairman; L. E. Agostin, R. H. McCarthy, Hugh McLelland, Frank Martin; secretary, A. O. Chudleigh, 48 Cannon Street, London, E. C.

TRINIDAD CENTRAL OIL FIELDS (LTD.).

Registered 1911. Acquired property licenses over 26,000 acres of oil lands at Tabaquite, Trinidad. Twenty-three wells have been sunk, and in 18 oil has been found. The company has erected storage tanks and is in a position to handle large shipments.

Capitalization.—Authorized £110,000 shares, outstanding £94,200 shares (par £1), of which £50,000 are fully paid and the remainder 87½ per cent paid in.

Income account.—Year ended April 30, 1915, showed a net profit of £1,910, as compared with £379 in 1913–14. Cash on hand, £7,045; stores, £3,895; debtors, £516; stock of oil, £3,367; creditors and bills payable, £2,470.

Directors.—A. Duckham, chairman; P. M. Stewart, H. C. B. Underdown: secretary, R. A. Longcroft, 79 Bishopsgate, London, E. C.

TRINIDAD LEASEHOLDS (LTD.).

This company was registered in 1913. It acquired a lease of oil lands in the island of Trinidad, area about 81 square miles, and a further exploration license over 20,000 additional acres. About 65,000 acres are held at present. A number of wells are producing, mostly on the properties acquired from the Trinidad Forest Reserve Oil Co. (Ltd.). A 26-mile pipe line, tanks, and a refining plant are owned. Production commenced May, 1914. For the first 13 months the production totaled 103,000 barrels.

Capitalization.—Shares authorized, £500,000; outstanding, £417,500. Loans, 6 per cent, due June 30, 1917, £135,000.

Income account not yet published.

Directors.—T. J. Milner, chairman; R. H. McCarthy, J. L. Siddall, A. W. Rogers, Maj. H. L. Sante. Office: 1 London Wall Buildings, London, E. C. Manager in Trinidad: H. S. Fuller. Trinidad office: 76 Marine Square, Port of Spain.

TRINIDAD OIL & TRANSPORT CO. (INC.).

Registered December, 1913, and reregistered April, 1914. Acquired the Trinidad properties of the Venezuela Oilfields (Ltd.) (previously acquired by this company from the South Naparima Co), total 346 acres, and at the same time arranged to take over the properties operated by the South Naparima Oil Co. (743 acres). Seven wells have been sunk on the lands acquired from the Venezuelan company, their depth varying from 291 to 1,803 feet. From five of these wells 67,861 barrels of oil were produced during 1915. In addition, 8,716 barrels were produced on other properties. The production was, however, limited to the available storage facilities. Property (49½ acres) located at Pointe-a-Pierre, on the Gulf of Paria, has been leased for 37 years. A pipe line will be constructed to this port.

Capitalization.—Shares authorized, £300,000; outstanding, £49,174; reserved to be issued to the South Naparima Oil Co. (Ltd.), £66,000; bills payable, £34,318; creditors, £5,930; value of property acquired or under option, £137,053; material, stores, etc., £5,243; cash, £1,126; sundry debtors, £1,637; oil, etc., £4,623.

Income account.—1915: Gross receipts, £11,958 (1914, £2,669); operating expenses and depreciation, £7,690; profits, £4,269; rents, salaries, amounts written off, etc., £4,872.

Directors.—W. W. Rutherford, M. P., R. F. Strachan; secretary, A. O. Chudleigh, 48 Cannon Street, London, E. C.

Editor's Note.—A word of explanation seems desirable with regard to such enterprises as are mentioned both in the main text of Special Agent Halsey's report and in the foregoing appendixes. The statements in the appendixes are mostly based on conditions at a time not later than December 31, 1915. While this book was in press figures became available, in certain instances, for 1916, 1917, or even for the fiscal year ended June 30, 1918. These recent figures have been inserted in the main body of the report, with the intention of bringing all statistics as nearly up to date as possible. However, it has been deemed inadvisable and impracticable to duplicate such new figures in the appendixes. In the case of the relatively few companies to which these remarks apply, the earlier figures given in the appendixes are regarded as supplementing those in the report proper and facilitating a more ample, comprehensive survey of developments.

Appendix C.—INTERNATIONAL ENTERPRISES AND GENERAL DATA.

MERCANTILE, PUBLIC UTILITY, AND SHIPPING COMPANIES.

FALKLAND ISLAND CO.

Chartered 1851. Purchased a large portion of the Falkland Islands. Raises and markets sheep in large quantities and does a general business.

Capitalization.—Preference shares (5 per cent cumulative), £33,000; ordinary shares, £110,000 (par in both classes, £10).

Dividends.—On ordinary shares: 1903, 15 per cent; 1904, 20 per cent; 1905, 25 per cent; 1906, 35 per cent; 1907, 30 per cent; 1908, 25 per cent; 1909, 30 per cent; 1910 to 1913, inclusive, 35 per cent; 1914, 40 per cent.

No income account is made public. Reserve funds, £53,500. Carried forward, £9,677.

Directors.—F. E. Cobb, chairman; R. H. Cobb, R. Blake, W. M. Dean, M. E. Hughes-Hughes, A. W. Lafone; secretary, E. B. Goddard, 61 Gracechurch Street, London, E. C. Office also at Port Stanley, Falkland Islands.

INTERNATIONAL LIGHT & POWER CO. (LTD.).

This company was chartered in 1913 under the laws of the Dominion of Canada and owns all the stock and debentures of (1) the Venezuela Electric Light Co., (2) the Compañía Luz y Fuerza de Parana (of Argentina), (3) the Compañía de Electricidad de Merida. The operations of (1) and (2) are described under their respective heads. The companies are operated under the management of J. G. White & Co. (Ltd.).

Capitalization.—June 30, 1915: 6 per cent cumulative preference shares. $10,000,000 authorized, $1,000,000 outstanding; ordinary shares, $10,000,000 authorized, $3,000,000 outstanding; 5 per cent sterling first-mortgage debentures, £400,000 authorized, £300,000 outstanding (an additional £100,000 due the vendors as per purchasing agreement). The preference shares were largely disposed of in 1913 at £18 per share with bonus of $60 in ordinary shares.

INCOME ACCOUNTS.

Items	Year ended June 30—	
	1914	1915
Interest, dividends, etc., received:		
Venezuela Electric Light Co.	£23,084	£18,153
Compañía de Electricidad de Merida	8,802	2,599
Compañía Luz y Fuerza de Parana	9,565	7,797
Total, including transfer fees, etc	41,573	28,551
Interest and other charges paid	17,859	18,281
Balance (surplus)	23,714	10,273

Regular dividends at the rate of 6 per cent per annum have been paid on the preference shares.

Directors.—Follett Holt, president; George M. Booth, William C. Burton, A. N. Connett, Francis M. Voules; secretary, E. A. Borel. Office: 9 Cloak Lane, Cannon Street, London, E. C.

KOSMOS (GERMAN) STEAMSHIP CO.

This company, under normal conditions, operated a line of steamers between Germany, Belgium, and the various ports of South America (particularly the west coast), Central America (west coast), Mexico, etc. Steamers stopped at most local ports. The service has been abandoned owing to the war.

Capitalization.—$3,332,000 shares (year 1913). Reserves, $2,633,265; bills receivable, $1,345,674; cash and other assets, $4,449,337.

Gross earnings.—$1,514,069 (year 1913).

Dividends.—1912, 14 per cent; 1913, 16 per cent.

ORIENTAL MAIL STEAMSHIP CO. (TOYO KISEN KAISHA).

This company, incorporated in Japan 1896, operates a fortnightly steamship service between Yokohama, Japan, and the west coast of South America. Salina Cruz, Callao, Iquique, Valparaiso, and Coronel are called at. In addition, the company operates a monthly service between Japan and San Francisco (three steamers, 13,000 to 14,000 tons). The steamers in the South American service vary in gross tonnage from 5,000 to 9,300, and in speed from 12 to 17 knots. Thirteen steamers were in service in January, 1914, with a gross tonnage of 88,000.

Capitalization.—December 31, 1913: $4,855,000 United States gold ($6,474,000 authorized). Reserves, $447,556.

INCOME ACCOUNTS.

Items.	1912	1913
Gross receipts	$2,516,806	$2,844,186
Subsidies	1,674,765	1,643,763
Total receipts	4,191,571	4,487,949
Operating expenses	3,741,191	4,091,421
Net earnings	450,380	396,528
Balance carried over	3,540	1,234
Amount available for dividends	453,920	397,762
Dividends	[a] 414,336	[b] 373,874

[a] 10 per cent on $4,143,360 stock.

[b] 7.7 per cent.

Office: Yokohama, Japan.

PACIFIC STEAM NAVIGATION CO. (LTD.).

This company was incorporated in Great Britain in 1840, being founded by William Wheelwright, of Newburyport, Mass. Wheelwright first made attempts to interest American financiers in his scheme, but was finally compelled to go to Great Britain for financial aid. The company, in later years, has been controlled by the Royal Mail Steam Packet Co. and operates between Liverpool, Panama, Callao, and Valparaiso, as well as local ports on the west coast of South America.

Capitalization.—£1,500,000 shares, all held by the Royal Mail Steam Packet Co.

The subvention received from Great Britain is £32,000, including £2,500 from the Falkland Islands. Formerly the company received an annual sum from the Chilean Government, but this has been discontinued and valuable privileges at the Government dock at Valparaiso substituted therefor.

The book value of the fleet (35 ships) is $10,423,566 (United States gold), and the total tonnage is 197,787.

Dividends.—In 1914, 6 per cent ($437,985).

Directors.—T. Rome, chairman; J. C. Nicholson, J. Cameron Head, W. C. Kenny, A. C. Lubbock, Sir O. C. Phillips, Sir J. Savory, Bart., A. S. Williams. General manager: R. R. Lamb, Valparaiso, Chile. Secretary: T. H. Darlington. Office: 31 James Street, Liverpool, England.

ROYAL BELGIAN ARGENTINE STEAMSHIP CO.

This company, incorporated 1906, owned four steamers (1,800 to 3,000 net tons) and was building others at the outbreak of the war. Additional ships were chartered, and service was maintained between Antwerp and Buenos Aires.

Capitalization.—5,000,000 francs shares; loans, 2,000,000 francs (from the Belgian Government). Shares listed on Brussels Bourse.

Head office (year 1914): Antwerp, Belgium.

STATISTICS OF IMPORTANT LATIN-AMERICAN BANKS.

The following table gives statistics with regard to six of the most important banking institutions in the Latin-American field:

Banks.	Capital and reserves.		Deposits.	
	1915-16	1916-17	1915-16	1916-17
Anglo-South American	£3,833,827	£3,833,827	£9,076,322	£14,114,982
Banco Español del Rio de La Plata	12,903,750	12,929,845	17,494,107	21,563,046
British Bank of South America	2,093,383	2,095,174	7,502,838	8,029,128
Commercial Bank of Spanish America	307,417	294,536	125,740	110,025
London and Brazilian	2,650,000	2,650,000	8,480,897	8,602,124
London and River Plate	3,800,000	3,800,000	20,581,475	20,369,465
Total	25,588,377	25,603,382	63,261,379	72,788,770

Banks.	Cash.		Investments.		Discounts and advances.	
	1915-16	1916-17	1915-16	1916-17	1915-16	1916-17
Anglo-South American	£2,184,625	£3,037,453	£1,840,383	£2,200,333	£13,424,098	£18,816,402
Banco Español del Rio de La Plata	7,755,246	7,474,521	767,328	775,805	19,459,221	21,156,052
British Bank of South America	3,441,908	2,954,927	....	....	9,721,404	11,620,639
Commercial Bank of Spanish America	33,352	36,819	42,641	41,976	397,072	382,480
London and Brazilian	5,498,060	6,359,940	....	....	7,040,968	6,459,540
London and River Plate	9,519,149	8,267,245	....	....	20,759,089	21,242,530
Total	28,432,340	28,130,905	2,650,352	3,018,114	70,801,852	79,677,643

The following table gives the quotations of the shares of four British South American banks:

Banks.	Amount of share.	Paid up per share.	Price, July 30, 1914.	Price, Sept. 30, 1916.	Price, Sept. 30, 1917.	Yield.
						Per cent.
Anglo-South American	£10	£5	£7¼	£6⅞	£7½	6
British Bank of South America	20	10	22½	18¼	18	6⅛
London and Brazilian	20	10	29½	25½	24	6⅛
London and River Plate	25	15	49	39	35	6 1/16

The data concerning the banks mentioned in this appendix have been largely taken from the London Economist of October 20, 1917. The banks of South and Central America have been discussed at length in the various chapters of this monograph, but it is believed that complete balance-sheet statements of a number of the more important institutions will prove of value to those interested in the banking situation.

BRITISH BANK OF SOUTH AMERICA (LTD.).

The report for the financial year ended December 31, 1916, states that the gross profits, after allowing for rebate of interest on current bills and drafts, for interest on deposits, and making ample provision for bad and doubtful debts and contingencies, amounted to £324,631; this, with the balance of £90,784 brought forward from the previous year, made £415,415. After deducting all charges of the head office and branches, amounting to £181,825, income tax and Government taxes in Brazil and the River Plate (together £23,351), there remained £210,239 available. A dividend on account of 10s. per share, amounting to £50,000, was paid in September, 1916, and it was recommended that a further dividend of 14s. per share be declared payable on April 20, making for the year a distribution of 24s. per share, or 12 per cent, subject to income tax, on the paid-up capital of the bank of £1,000,000. After paying the above dividend there remained the sum of £90,239, which the directors carried forward.

Following is the balance sheet as of December 31, 1916:

Liabilities.	Amount.	Assets.	Amount.
Capital paid up, £10 per share	£1,000,000	Cash in hand, at bankers and at call	£2,954,927
Reserve fund	1,000,000	Bills receivable in hand, and deposited with the company's bankers	4,953,215
Pension and benevolent fund	95,174	Other accounts	6,667,424
Amount due on current and deposit accounts	8,029,128	Freehold and leasehold premises in London and South America at cost, less amounts written off	205,504
Bills payable	2,865,181		
Other accounts	1,631,348		
Profit and loss account, as per statement below	160,239		
	14,781,070		14,781,070

PROFIT AND LOSS ACCOUNT.

Debit.	Amount.	Credit.	Amount.
General charges at head office and the branches, including directors' remuneration	£181,825	Balance from last account	£90,784
Income tax	11,815	Gross profits, after allowing for rebate of interest on current bills and drafts, interest on deposits, and ample provision for bad and doubtful debts and contingencies	324,631
Government taxes in Brazil and the River Plate	11,536		
Dividend on account for the half year ended June 30, 1916	50,000		
Balance carried down	160,239		
	415,415		415,415

ANGLO-SOUTH AMERICAN BANK (LTD.).

Following is the balance sheet of the Anglo-South American Bank as of June 30, 1917:

Liabilities.	Amount.	Assets.	Amount.
Issued capital—450,000 shares of £10 each, £5 paid	£2,250,000	Cash in hand, at bankers, and at call.	£3,037,453
Reserve fund	1,400,000	Bills receivable	9,309,600
Special reserve, on account of depreciation of capital in Chile	183,827	Investments: English and foreign Government, railway and other securities, £1,804,341; holdings in foreign banks and kindred companies, £705,992—£2,510,333; less investments reserve, £310,000	2,200,333
Bills payable—drafts on head office and branches, £5,643,122; drafts on London and foreign bankers, £338,044	5,981,166	Liability of customers for acceptances, per contra	1,295,830
Acceptances on account of customers	1,295,830	Advances, etc	9,506,802
Current, deposit, and other accounts	14,114,982	Bank premises, office furniture, etc	309,817
Rebate of interest on bills, etc., not due.	40,713		
Profit and loss, as per account below, £460,817, less interim dividend paid on Apr. 24, 1917, £67,500	393,317		
Liability on bills rediscounted, on uncalled capital, on investments held, and guarantees, £4,681,163, of which £4,436,728 has run off.			
	25,659,835		25,659,835

NOTES.—The difference between the assets and liabilities in Chile is taken at the rate of exchange current at the date of the accounts, viz, 12$\frac{11}{16}$d. with the exception of such portion as represents the capital employed in Chile, which is now taken at 18d.

The special reserve of £183,827 is sufficient to write this capital down to 10d. per dollar.

Out of the above assets £1,576,356 have been lodged: As guaranty to the Chilean Government for due payment of drafts issued for duties ,£419,538; for other purposes (amount of lien), £1,156,818—£1,576,356.

LONDON AND RIVER PLATE BANK (LTD.).

Following is the balance sheet of the London and River Plate Bank, as of September 30, 1916:

Liabilities.	Amount.	Assets.	Amount.
Capital, 120,000 shares of £25 each, on which £15 per share has been paid	£1,800,000	Cash on hand, at bankers, and at branches	£8,267,245
Reserve fund	2,000,000	Bills receivable, bills discounted, advances, securities, etc., after deducting provision for contingencies	21,242,530
Acceptances—account branches	3,078,267	Bills receivable on London and continent not yet liquidated in consequence of the war	65,813
Acceptances—customers' drafts under merchandise credits, etc	44,022	Bills for collection	3,324,085
Bills advised—drafts in transit	1,595,153	Bank premises, including furniture	332,930
Current accounts, etc., and deposits in currency at branches	19,937,662		
Current accounts and deposits at head office	431,803		
Montevideo branch—local currency emission	9,039		
Bills for collection on account of customers, per contra	3,324,085		
Rebate of interest on bills not due	59,614		
Profit and loss account	352,958		
	33,232,603		33,232,603

NOTE.—Contingent liability in consequence of the war, as indorsers of foreign bills negotiated, £13,665. Contingent liability on bills guaranteed, £41,809, of which £23,461 has since run off.

COMMERCIAL BANK OF SPANISH AMERICA (LTD.).

Following is the balance sheet of the Commercial Bank of Spanish America as of June 30, 1916:

Liabilities.	Amount.	Assets.	Amount.
Capital issued: 259,979 "A" shares of £1 each, fully paid, £259,979; 1,438 "B" shares of £1 each, fully paid, £1,438	£261,417	Cash at bankers and in hand	£36,819
Unclaimed dividends	119	Investments taken at market value at June 30, 1916, where quoted, otherwise at valuation	41,976
Reserve fund	33,000	Bills receivable	33,753
Current and other accounts	110,025	Loan and other accounts, including balances at branches, £373,727; less written off by transfer of suspense reserve account, £25,000	348,727
Bills payable	91,324	Properties and furniture	4,060
Profit and loss account, £14,946; less amount transferred to reserve fund, £1,000; suspense reserve account, £11,000—£12,000	2,946	Goodwill account, £50,677; less amount received re conversion of 49,239 "B" shares, £24,620	26,057
		Expenses re issue of new capital (stamp duty, underwriting commission, etc., as per last account)	7,439
	498,831		498,831

PROFIT AND LOSS ACCOUNT.

Debit.	Amount.	Credit.	Amount.
Charges, including directors' fees, rent, taxes, salaries, cables, etc	£10,044	Balance brought forward from preceding year	£3,893
Income tax	1,858	Gross profits for the year ended June 30, 1916	25,682
Amount written off investments	2,727		
Amount added to reserve fund	1,000		
Suspense reserve account	11,000		
Balance	2,946		
	29,575		29,575

LONDON BANK OF CENTRAL AMERICA (LTD.).

Following is the balance sheet of the London Bank of Central America as of September 30, 1916:

Liabilities.	Amount.	Assets.	Amount.
Capital 27,570 shares of £1 each, fully paid	£27,570	Cash at bankers	£341
Sundry creditors	498	Shares of Banco Salvadoreño held for distribution to shareholders	244
Unclaimed dividends	916	Shares of Commercial Bank of Spanish America (Ltd.), held for distribution to shareholders, including 1,193 "B" shares converted into "A" shares by payment of 10s. per share out of the moneys in hand belonging to the same holders	2,386
Reserve fund	6,730	"A" shares of Commercial Bank of Spanish America, taken at par	31,403
Shares of Banco Salvadoreño held for distribution to shareholders	244	Other securities	3,838
Shares of Commercial Bank of Spanish America (Ltd.), held for distribution to shareholders	2,386	Sundry debtors	479
Profit and loss account—Balance brought forward from last year, £41; income for the year, £618—£659, less expenses £312	347		
	38,691		38,691

BANCO ESPAÑOL DEL RIO DE LA PLATA.

The report of the directors states that the net profits for the financial year ended June 30, 1917, amounted to £485,837, which, after deduction of £238,206 distributed in January, 1916, leaves a balance of £247,631, which the directors proposed to allocate as follows: Ninety per cent to the shareholders, £214,469; 2 per cent to the directors and auditors, £4,766; 2¾ per cent to the staff pension and benevolent fund, £6,553; 1 per cent to the founder, Mr. A. J. Coelho, £2,383; one-fourth per cent to contributions to charity, £596; 4 per cent to the reserve fund, £9,532; total, £238,299. The balance of £9,332 was to be carried forward. The statutory reserve fund was to be increased to £4,209,219.

Following is the balance sheet as of June 30, 1917:

Liabilities.	Amount.	Assets.	Amount.
Capital subscribed	£8,730,158	Cash, at head office, Argentine and European branches	£7,474,521
Current accounts, and deposits at fixed term	21,563,046	Branches	3,042,510
Rebate—Corresponding to next half year	146,633	Shareholders (liability on uncalled capital)	161,840
Conversion account—Balance	3,520,501	Bills discounted and advances in current account	21,156,052
Reserve fund	4,199,687	Conversion account—Balance	3,520,501
Sundries	933,261	Freehold property, furniture and fittings	1,176,270
Profit and loss balance (after paying interim dividend of 2½ per cent in January, 1917)	247,631	Sundry securities	775,805
		Sundries—Correspondents and accounts in process of liquidation	2,033,388
	39,340,917		39,340,917

PROFIT AND LOSS ACCOUNT.

Debit.	Amount.	Credit.	Amount.
Interest, amortization of furniture, fittings, and premises, general charges, taxes, etc., dividend on founders' shares, salaries, etc	£398,417	Balance brought forward	£3,394
Allowance for bad and doubtful debts	62,022	Interest and discount	755,877
Distributed in January last:		Exchange and commission	186,465
Dividends	221,532		
Charities, as per articles of association	595		
Staff pension and benevolent fund	6,551		
Reserve fund	9,528		
Balance	247,631		
	946,276		946,276

LONDON AND BRAZILIAN BANK (LTD.).

The report presented to the meeting held on May 1, 1917, states that the accounts show an available balance of £498,850 (including £297,571 brought forward from the preceding year). An interim dividend of 14s. per share, amounting to £87,500, was paid in October, 1916. The directors recommended a further payment of 14s. per share, being a dividend at the rate of 14 per cent per annum. The directors also recommended the payment of a bonus of 4s. per share, thus making a total distribution of 16 per cent per annum, subject to income tax, on the paid-up capital of the bank. The above payments absorbed £200,000, leaving a balance of £298,850 to the credit of profit and loss new account.

Following is the balance sheet, as of January 31, 1917:

Liabilities.	Amount.	Assets.	Amount.
Capital—125,000 shares of £20 each; paid up £10 per share	£1,250,000	Specie and cash at head office and branches	£4,941,529
Reserve fund	1,400,000	Bills receivable	2,930,301
Current accounts and deposits in currency at branches, £8,335,728; current accounts and deposits at head office, £266,396	8,602,124	Bills discounted, loans, etc	6,459,540
Bills payable	3,538,408	Cash and remittances in transit, etc	1,418,411
Agents and sundry accounts	880,499	Bills for collection, as per contra	3,150,916
Bills for collection on account of customers	3,150,916	Bank premises at head office and branches	261,002
Profit and loss, £498,850; less dividend (interim) paid to July 31, 1916, £87,500	411,350	Furniture at head office and branches	1,598
	19,233,297		19,233,297

NOTE.—Contingent liabilities not included in balance sheet: As indorsers of foreign bills negotiated, £90,818. Staff pension and benevolent fund trust, £140,000.

PROFIT AND LOSS ACCOUNT.

Debit.	Amount.	Credit.	Amount.
Charges at head office and branches	£255,431	Balance brought forward	£297,571
Taxes at home and abroad	45,355	Profit to Jan. 31, 1917, after providing for rebate of interest on bills discounted not due, and bad and doubtful debts	502,065
Dividend (interim) for the half year ended July 31, 1916	87,500		
Balance carried forward	411,350		
	799,636		799,636

BANCO ITALIANO DEL URUGUAY.

The Banco Italiano del Uruguay, of Montevideo, has an authorized capital of 5,000,000 Uruguayan gold pesos, of which 3,000,000 pesos is paid up. The reserve fund is 996,250 gold pesos and the provision fund 150,000 gold pesos.

BANCO ITALIANO, LIMA, PERU.

Following is the statement of accounts of the Banco Italiano, of Lima, Peru, as of June 30, 1917. The figures are expressed in Peruvian pounds, equivalent to the pound sterling ($4.8665 in United States currency).

Liabilities.	Amount	Assets.	Amount.
Capital paid up	£p. 200,000.—	Cash in hand and at bankers	£p. 917,937.4.55
Reserve funds	113,079.3.27	Gold deposit as guaranty for bank-note circulation	226,910.0.00
Bank-note circulation	226,910.0.00	Bills discounted	427,197.4.63
Current and fixed deposits	1,789,884.9.02	Advances in current account	415,260.7.10
Securities deposited	1,297,347.6.79	Securities deposited	1,297,347.6.79
Other accounts	151,065.6.39	Investments and other accounts	493,634.2.40
	3,778,287.5.47		3,778,287.5.47

BANCO DE CHILE.

Following is the balance sheet of the Banco de Chile as of June 30, 1917:

Liabilities.	Paper pesos.	Gold pesos of 18 d.	Assets.	Paper pesos.	Gold pesos of 18 d.
Deposits:			Cash:		
At sight and in current account	101,999,533		Treasury notes	1,778,500	
Fixed	75,905,035		Fiscal notes	20,136,881	
In current account and at sight (gold)		22,148,381	Gold disposable in Chile and London		5,656,002
In current account in London at 18d		7,647,453	Silver	1,322,479	
Clearing balances outstanding	1,107,860	237,935	At short notice in Europe		1,996,000
Deposit of bonds and documents	193,144,925		Checks and balances disposable in other banks in Chile and abroad	10,302,159	16,311,661
Retirement fund	2,351,572		Investment account	5,829,649	5,753,667
Various creditors	11,549,874	16,401,962	Bonds in custody and guaranty	193,144,925	
Suspense account		2,862,883	Real estate	11,098,149	
Interest, discount, etc		76,869	Furniture	512,474	4,053
Government Issue Department	6,000,000		Books and stationery	379,424	
Government Issue Department (a/c customers)	3,000,000		Advances and other documents	181,823,017	
Paid-up capital	40,000,000		In gold in Chile and London at 18d		23,041,266
Reserve fund	22,000,000		(Clause 10 of bank act)	1,091,463	
Carry forward from last account	2,217,933	5,000,000	(Art. 14, law 1054 of July 31, 1898)	178,125	
Unpaid dividends	78,931		Agencies and branches	6,456,090	1,612,834
Profit and loss account	3,801,179		Suspense account	4,879,067	
			Interest discounts, etc	788,940	
			Discount of Government advances to nitrate producers.	358,500	
			Advances to other banks	77,000	
			Treasury notes, law 3094 of April 29, 1916	23,000,000	
	463,156,842	54,375,483		463,156,842	54,375,483

COLONIAL BANK.

In addition to the banks previously listed in this appendix there is submitted herewith a statement of the Colonial Bank (incorporated 1836), which operates principally in the British West Indian Islands. The capitalization of the bank is as follows:

	Total.	Per share.
Subscribed	£2,000,000	£20
Paid up	600,000	6
Callable	400,000	4
Reserved	1,000,000	10
Market value	675,000	6¾

The net profits for the half year ended December 31, 1916, amounted to £33,234, which, with the balance of £43,701 brought forward, made an available sum of £76,935. A dividend of 3½ per cent for the half year was recommended, absorbing £15,750, and £50,000 was transferred to reserve fund, leaving £11,185 to be carried forward. Assets and liabilities are as follows:

ASSETS.

Year ended June 30—	Cash available.	Investments.	Bills receivable, etc.	Bills in transit, discounts, advances, etc.	Premises, etc.
1890	£923,192	£970,643	£1,300,043	£1,372,798	£25,000
1895	715,792	602,498	1,464,297	1,952,055	25,000
1900	575,566	1,098,695	1,035,101	1,227,752	25,000
1905	669,750	1,046,521	1,083,519	1,140,998	50,000
1910	917,823	1,285,965	979,368	1,017,213	50,000
1911	753,845	1,376,269	856,796	1,049,404	80,000
1912	649,523	1,237,038	860,341	1,222,781	80,000
1913	478,296	1,122,897	974,100	1,357,448	80,000
1914	676,805	1,098,554	923,580	1,233,785	80,000
1915	626,142	1,114,689	913,568	1,190,765	80,000
1916	606,364	907,498	1,799,747	1,729,791	[a] 282,499
1917 [b]	591,701	739,916	2,515,083	1,533,616	[a] 464,675

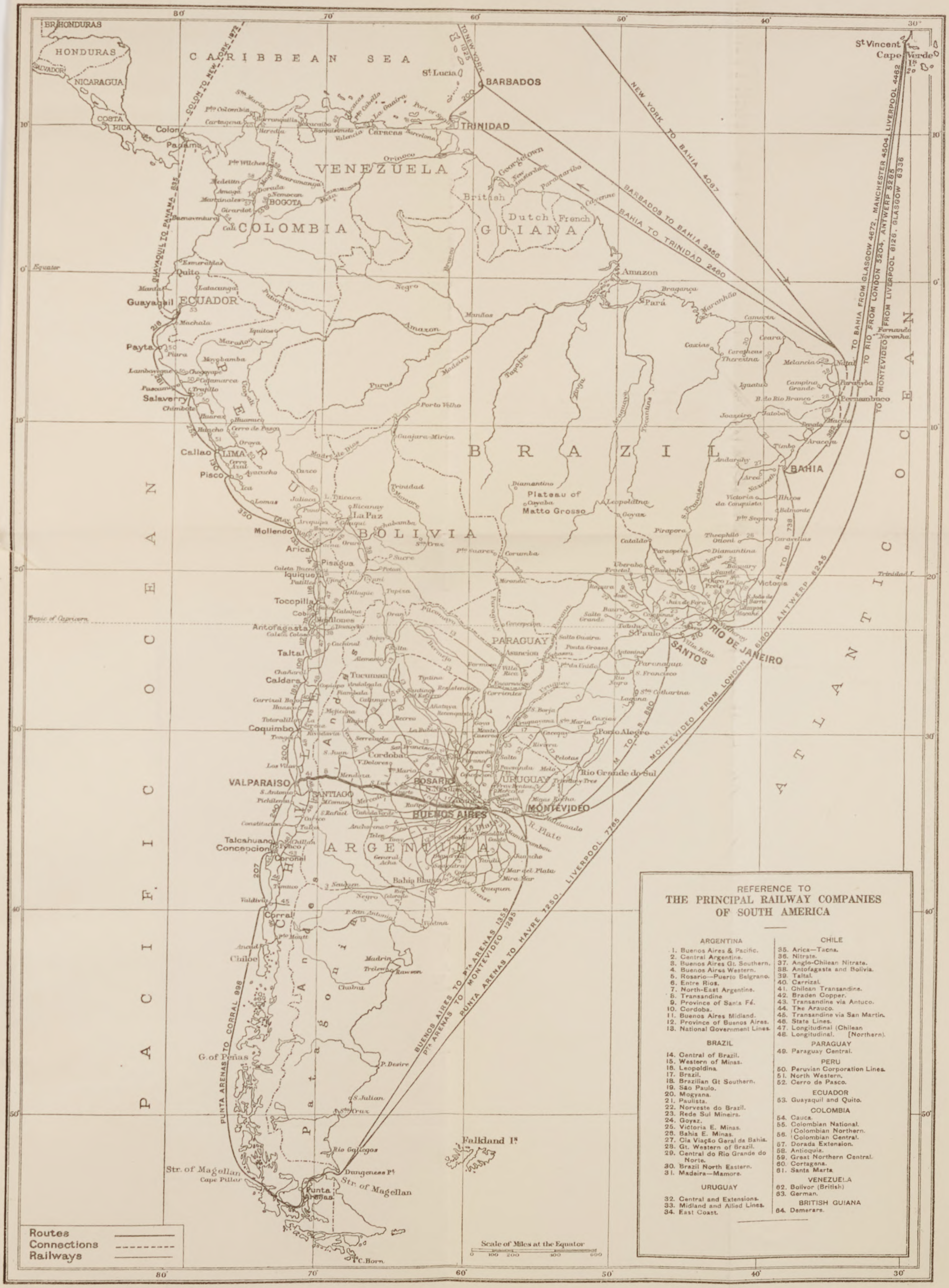
[a] Liability of customers, £202,499 and £384,675.

[b] Dec. 31, 1916.

LIABILITIES.

Year ended June 30—	Number of branches.	Capital and reserves.	Undivided profits.	Notes.	Bills payable, etc.	Deposit and current accounts.	Total liabilities or assets.
1890	13	£730,000	£58,724	£426,346	£1,463,103	£1,913,503	£4,591,676
1895	14	750,000	37,660	452,672	1,794,964	1,724,346	4,759,642
1900	13	750,000	26,597	439,871	794,592	1,951,054	3,962,114
1905	13	750,000	41,000	439,676	743,205	2,016,907	3,990,788
1910	13	750,000	54,357	451,967	539,471	2,454,574	4,250,369
1911	15	750,000	61,567	438,041	504,402	2,362,304	4,116,314
1912	14	750,000	62,906	428,802	493,330	2,314,645	4,049,683
1913	14	750,000	57,057	473,648	488,114	2,243,922	4,012,741
1914	14	750,000	53,682	414,225	518,303	2,276,514	4,012,724
1915	15	750,000	66,890	429,638	475,389	2,203,247	3,925,164
1916	19	750,000	60,501	496,855	672,477	3,346,066	5,325,899
1917 [a]	27	750,000	76,935	454,975	848,647	3,714,434	5,844,991

[a] Dec. 31, 1916.



REFERENCE TO
THE PRINCIPAL RAILWAY COMPANIES
OF SOUTH AMERICA

ARGENTINA

1. Buenos Aires & Pacific.
2. Central Argentine.
3. Buenos Aires Gt. Southern.
4. Buenos Aires Western.
5. Rosario—Puerto Belgrano.
6. Entre Rios.
7. North-East Argentine.
8. Transandine
9. Province of Santa Fé.
10. Cordoba.
11. Buenos Aires Midland.
12. Province of Buenos Aires.
13. National Government Lines.

BRAZIL

14. Central of Brazil.
15. Western of Minas.
16. Leopoldina.
17. Brazil.
18. Brazilian Gt Southern.
19. São Paulo.
20. Mogyana.
21. Paulista.
22. Norveste do Brazil.
23. Rede Sul Mineira.
24. Goyaz.
25. Victoria E. Minas.
26. Bahia E. Minas.
27. Cia Viação Geral da Bahia.
28. Gt. Western of Brazil.
29. Central do Rio Grande do Norte.
30. Brazil North Eastern.
31. Madeira—Mamore.

URUGUAY

32. Central and Extensions.
33. Midland and Allied Lines.
34. East Coast.

CHILE

35. Arica—Tacna.
36. Nitrate.
37. Anglo-Chilean Nitrate.
38. Antofagasta and Bolivia.
39. Taltal.
40. Carrizal.
41. Chilean Transandine.
42. Braden Copper.
43. Transandine via Antuco.
44. The Arauco.
45. Transandine via San Martin.
46. State Lines.
47. Longitudinal (Chilean
48. Longitudinal. [Northern).

PARAGUAY

49. Paraguay Central.

PERU

50. Peruvian Corporation Lines.
51. North Western.
52. Cerro de Pasco.

ECUADOR

53. Guayaquil and Quito.

COLOMBIA

54. Cauca.
55. Colombian National.
56. {Colombian Northern. Colombian Central.
57. Dorada Extension.
58. Antioquia.
59. Great Northern Central.
60. Cortagena.
61. Santa Marta

VENEZUELA

62. Bolivor (British)
63. German.

BRITISH GUIANA

64. Demerara.

ALF Collections Vault
3 0000 091 891 634